



February 27, 2025

Matt Hammerstein  
Woith Engineering, Inc.  
3860 O'Leary Street, Suite A  
Missoula, Mt 59808

Reference: Paisley Park Subdivision, Missoula, MT  
Project No. 250155

Dear Matt:

The purpose of this letter is to provide a traffic analysis for the Paisley Park Subdivision and verification of recommendations provided in the July 2020 Mullan BUILD traffic study completed by the City of Missoula, Montana. This letter will address existing and projected traffic operations at the intersections of Mullan Road with Chuck Wagon Drive and George Elmer Drive, as well as the future intersection of George Elmer Drive/England Boulevard. In addition to the Mullan BUILD report, traffic impacts in the study area have been previously evaluated in support of the Heron's Landing and Remington Flats subdivisions.

Paisley Park Subdivision proposes the construction of 671 total new dwelling units split across multiple phases. Attachment 7 of the subdivision application illustrates the current proposed layout and phasing plan for the subdivision. The site is located between George Elmer Drive and Chuck Wagon Drive approximately 3/4 mile north of Mullan Road. Access is proposed via Chuck Wagon Drive and England Boulevard. Future connections would include Tenderfoot Way, Riata Road, Camden Street, and Somerset Way.

### **Existing Conditions**

Traffic data was collected at the study area intersections on Tuesday, February 11, 2025, using Miovision Scout video-based systems and a Houston Radar unit. The weekday AM and PM peak hour periods were found to occur from 7:30 to 8:30 AM and 5:00 to 6:00 PM, respectively. Detailed traffic count data worksheets are included in Attachment B.

The Existing Conditions (2025) intersection capacity calculations showed that the Mullan Road/George Elmer Drive and Mullan Road/Chuck Wagon Drive intersections both currently operate at LOS C or better on all approaches in both peak hours. At the Mullan Road/George Elmer Drive roundabout intersection, 95th percentile queues reach up to 9 vehicles on the eastbound approach during the AM peak hour with

queues of up to 6 vehicles on the westbound approach in the PM peak hour. Figure 1 (Attachment A) summarizes the calculated Existing Conditions (2025) peak hour turning movement volumes and LOS results for the AM and PM peak hours. Table 1 below provides a detailed capacity summary table and capacity calculation worksheets can be found in Attachment C.

Table 1: Existing Conditions (2025) Capacity Calculations Summary

| Intersection                | Approach     | Existing (2025)           |     |                    |                   |     |                    |
|-----------------------------|--------------|---------------------------|-----|--------------------|-------------------|-----|--------------------|
|                             |              | AM Peak                   |     |                    | PM Peak           |     |                    |
|                             |              | Avg Delay (s/veh)         | LOS | 95th % Queue (veh) | Avg Delay (s/veh) | LOS | 95th % Queue (veh) |
| Intersection Control        |              | Roundabout                |     |                    |                   |     |                    |
| Mullan Rd & George Elmer Dr | SB           | 4.2                       | A   | 1                  | 6.6               | A   | 1                  |
|                             | EB           | 15.8                      | C   | 9                  | 5.3               | A   | 2                  |
|                             | WB           | 3.8                       | A   | 1                  | 7.8               | A   | 4                  |
|                             | Intersection | 12.3                      | B   | --                 | 7.0               | A   | --                 |
| Intersection Control        |              | One-Way Stop-Control (SB) |     |                    |                   |     |                    |
| Mullan Rd & Chuck Wagon Dr  | SB           | 21.4                      | C   | 1                  | 20.7              | C   | 1                  |
|                             | EB           | 0.1                       | A   | 1                  | 0.3               | A   | 1                  |
|                             | WB           | 0.0                       | A   | 0                  | 0.0               | A   | 0                  |
|                             | Intersection | 1.1                       | A   | --                 | 0.6               | A   | --                 |

## **Trip Generation**

This study utilized Trip Generation, 11th Edition, published by the Institute of Transportation Engineers (ITE), which is the most widely accepted source in the United States or determining trip generation projections. For the Paisley Park Subdivision, Land Use Code 210 – Single-Family Detached Housing, Land Use Code 215 – Single-Family Attached Housing, and Land Use Code 220 – Multifamily Housing (Low-Rise) were utilized to project trip generation. Table 2 on the following page illustrates the results of the trip generation calculations for the site.

Full buildout of the Paisley Park Subdivision is projected to generate a total of 4,665 average weekday trips, with 285 trips (69 entering/216 exiting) during the AM peak hour and 365 trips (229 entering/136 exiting) during the PM peak hour.

Table 2: Paisley Park Subdivision Trip Generation Summary

| Land Use                                    | Independent Variable |                | Average Weekday |             |             | AM Peak Hour |           |            | PM Peak Hour |            |            |
|---|----------------------|----------------|-----------------|-------------|-------------|--------------|-----------|------------|--------------|------------|------------|
|   | Intensity            | Units          | total           | enter       | exit        | total        | enter     | exit       | total        | enter      | exit       |
| Single-Family Detached Housing <sup>1</sup> | 51                   | Dwelling Units | 481             | 241         | 240         | 36           | 9         | 27         | 48           | 30         | 18         |
| Single-Family Attached Housing <sup>2</sup> | 12                   | Dwelling Units | 86              | 43          | 43          | 6            | 2         | 4          | 7            | 4          | 3          |
| Multifamily Housing (Low-Rise) <sup>3</sup> | 608                  | Dwelling Units | 4098            | 2049        | 2049        | 243          | 58        | 185        | 310          | 195        | 115        |
| <b>Total New Trips</b>                      |                      |                | <b>4665</b>     | <b>2333</b> | <b>2332</b> | <b>285</b>   | <b>69</b> | <b>216</b> | <b>365</b>   | <b>229</b> | <b>136</b> |

- (1) Single-Family Detached Housing - Land Use 210\*  
 Units = Dwelling Units  
 Average Weekday: Average Rate = 9.43 (50% entering/50% exiting)  
 Peak Hour of the Adjacent Street, One Hour between 7 and 9 AM: Average Rate = 0.70 (25% entering/75% exiting)  
 Peak Hour of the Adjacent Street, One Hour between 4 and 6 PM: Average Rate = 0.94 (63% entering/37% exiting)
- (2) Single-Family Attached Housing - Land Use 215\*  
 Units = Dwelling Units  
 Average Weekday: Average Rate = 7.20 (50% entering/50% exiting)  
 Peak Hour of the Adjacent Street, One Hour between 7 and 9 AM: Average Rate = 0.48 (25% entering/75% exiting)  
 Peak Hour of the Adjacent Street, One Hour between 4 and 6 PM: Average Rate = 0.57 (59% entering/41% exiting)
- (3) Multifamily Housing (Low-Rise) - Land Use 220\*  
 Units = Dwelling Units  
 Average Weekday: Average Rate = 6.74 (50% entering/50% exiting)  
 Peak Hour of the Adjacent Street, One Hour between 7 and 9 AM: Average Rate = 0.40 (24% entering/76% exiting)  
 Peak Hour of the Adjacent Street, One Hour between 4 and 6 PM: Average Rate = 0.51 (63% entering/37% exiting)

\*Trip Generation, 11th Edition, Institute of Transportation Engineers, 2021

## **Trip Distribution, Traffic Assignment, and Future Projections**

The trip distribution for this study was calculated based on an inspection of existing traffic patterns, review of the 2020 Mullan BUILD study, and the Heron's Landing and Remington Flats traffic studies, both completed in 2019. Based on this data, it was assumed that 10 percent of all trips would travel to/from the west on Mullan Road, with the remaining 90 percent split between England Boulevard and Mullan Road to the east.

In addition to Paisley Park Subdivision, it is expected that Remington Flats, Heron's Landing, and 44 Ranch subdivisions will be constructed within a similar timeframe. Therefore, current buildout percentages of these subdivisions were estimated and trip generation calculations obtained from the previous traffic studies were applied to complete a projected trip assignment for all subdivisions assuming a completed connection to England Boulevard to the north.

Future projections were then calculated by combining trip assignments from all four developments with Existing Conditions (2025) volumes. A growth rate of 2.0 percent was calculated based on adjacent MDT historical traffic count data and applied only to thru movements on Mullan Road. This growth rate was not applied to other movements, as all other growth in the study area is expected to occur solely due to the developments evaluated. For the purposes of this analysis, it was assumed that all developments would be constructed by 2030. Figure 3 (Attachment A) illustrates the resulting AM and PM peak hour future (2030) traffic volume projections.

Daily trip ends were also calculated for Paisley Park Subdivision and the remaining three subdivisions in the area. Remaining total daily trip projections to be added to George Elmer Drive, Chuck Wagon Drive, and England Boulevard by the four developments are shown in Table 3 below.

Table 3: Study Area Remaining Daily Trip Ends

| Street             | Paisley Park Daily Trip Ends | Other Subdivision Trip Ends |
|--------------------|------------------------------|-----------------------------|
| England Boulevard  | 3,359                        | 3,324                       |
| George Elmer Drive | 653                          | 1,477                       |
| Chuck Wagon Drive  | 653                          | 1,354                       |

### Future Operations Analysis

Future (2030) capacity results project worsening capacity at both existing intersections, with at least one approach projected to operate at LOS E at each intersection. The new three-leg intersection of George Elmer Drive/England Boulevard was evaluated assuming that the northbound approach would be stop-controlled, and the eastbound and westbound approaches would be free-flowing. With this configuration, the intersection is projected to operate at LOS D on the northbound approach during the PM peak hour. Figure 2 (Attachment A) also illustrates the LOS results. Table 4 on the following page provides a detailed intersection capacity summary table, and capacity calculation worksheets for the Future (2030) traffic projections scenario can be found in Attachment D.

Table 4: Future (2030) Capacity Calculations Summary

| Intersection                   | Approach     | Future (2030)             |     |                    |                   |     |                    |
|--------------------------------|--------------|---------------------------|-----|--------------------|-------------------|-----|--------------------|
|                                |              | AM Peak                   |     |                    | PM Peak           |     |                    |
|                                |              | Avg Delay (s/veh)         | LOS | 95th % Queue (veh) | Avg Delay (s/veh) | LOS | 95th % Queue (veh) |
| Intersection Control           |              | One-Way Stop-Control (NB) |     |                    |                   |     |                    |
| England Blvd & George Elmer Dr | NB           | 15.3                      | C   | 4                  | 33.4              | D   | 4                  |
|                                | EB           | 0.0                       | A   | 0                  | 0.0               | A   | 0                  |
|                                | WB           | 4.4                       | A   | 1                  | 5.2               | A   | 2                  |
|                                | Intersection | 7.7                       | A   | --                 | 8.7               | A   | --                 |
| Intersection Control           |              | Roundabout                |     |                    |                   |     |                    |
| Mullan Rd & George Elmer Dr    | SB           | 5.3                       | A   | 1                  | 9.1               | A   | 2                  |
|                                | EB           | 38.4                      | E   | 19                 | 6.4               | A   | 2                  |
|                                | WB           | 4.1                       | A   | 1                  | 9.9               | A   | 6                  |
|                                | Intersection | 26.4                      | D   | --                 | 8.9               | A   | --                 |
| Intersection Control           |              | One-Way Stop-Control (SB) |     |                    |                   |     |                    |
| Mullan Rd & Chuck Wagon Dr     | SB           | 35.0                      | D   | 4                  | 42.2              | E   | 3                  |
|                                | EB           | 0.2                       | A   | 1                  | 1.5               | A   | 1                  |
|                                | WB           | 0.0                       | A   | 0                  | 0.0               | A   | 0                  |
|                                | Intersection | 4.4                       | A   | --                 | 3.3               | A   | --                 |



### **Mitigations Analysis**

Auxiliary right- and left-turn lane warrants were evaluated based on the methodology outlined in the MDT Traffic Engineering Manual (November 2007) for the Existing Conditions (2025) and Future (2030) analysis scenarios. It was found that a westbound right-turn lane is warranted at the Mullan Road/Chuck Wagon Drive intersection with current PM peak hour volumes. Currently there is a short westbound right-turn slip lane which has enough length for one to two vehicles. It is not striped and does not provide sufficient deceleration distance, so vehicles have to decelerate in the thru lane before merging into the slip lane. There is also a two-way left-turn lane (TWLTL) on Mullan Road at this intersection, which should be striped as a dedicated eastbound left-turn lane based on the existing and projected left-turn volumes.

A westbound left-turn lane is projected to be warranted at England Boulevard/George Elmer Drive intersection in the Future (2030) scenario. A sensitivity analysis of this warrant revealed that the turn lane is likely to become warranted as soon as the west leg of the intersection is constructed and opened with less than 10 percent of construction completed on the adjacent developments. Turn lane warrant worksheets can be found in Attachment E.

A preliminary traffic signal warrant analysis was completed at the Mullan Road/Chuck Wagon Drive intersection using criteria outlined in the MUTCD. The MUTCD presents several warrants that can be considered based on traffic volumes, school crossings, crash history, and others. As only four hours of traffic data was processed, not all warrants could be fully evaluated. It was found that the Four-Hour Vehicular Volume and Peak Hour warrants are projected to be met at this intersection in 2030. A sensitivity analysis showed that minor approach volumes are not likely to become great enough to meet the Four-Hour warrant until approximately 90 percent of the area developments are completed, and 50 percent buildout would be required to meet the Peak Hour Warrant. However, it should be noted that a large proportion of the minor approach volumes at this intersection are projected to be right turns and may be excluded from the signal warrant analysis given that there is currently a dedicated southbound right-turn lane. Traffic signal warrant worksheets can be found in Attachment E.

Future volumes at the Mullan Road/Chuck Wagon Drive intersection are likely to vary depending on operations at the intersection, and a higher number of vehicles may opt to use the roundabout at George Elmer Drive if wait times become too lengthy. This could eventually lead to a strain on the roundabout and a higher form of traffic control could become necessary at Chuck Wagon Drive to balance demand between

the two intersections. Additionally, the remaining undeveloped area of 44 Ranch Subdivision is located almost entirely west of Chuck Wagon Drive without a direct route to access George Elmer Drive, and Heron's Landing Subdivision is also likely to contribute a large volume of trips to Chuck Wagon Drive. Therefore, buildout of these subdivisions is likely to have the greatest impact on operations at the Mullan Road/Chuck Wagon Drive intersection compared to the Remington Flats and Paisley Park Subdivisions further north, which will have direct access to both routes. Another connection to Mullan Road to the west is proposed with Phase 17 of the 44 Ranch Subdivision via Shindig Drive which may divert some of the traffic from the Chuck Wagon Drive intersection. Due to these factors, traffic volumes and operations should continue to be monitored particularly in regard to development progression of the 44 Ranch and Heron's Landing Subdivisions and installation of a traffic signal or roundabout should be considered.

The Peak Hour signal warrant was also evaluated at the England Boulevard/George Elmer Drive intersection with Future (2030) projections, and it was not found to be met with the available data.

Future (2030) intersection capacity calculations were evaluated with various improvements for the England Boulevard/George Elmer Drive and Mullan Road/Chuck Wagon Drive intersections. Improved capacity calculations for the Future (2030) scenario can be found in Table 5 on the following page and the calculation worksheets are in Attachment F.

**England Boulevard/George Elmer Drive:** Installation of a westbound left-turn lane is projected to improve delay on the northbound approach by nearly 5.0 seconds per vehicle during the PM peak hour, but would remain at LOS D. The addition of separate northbound left-turn and right-turn lanes is projected to improve capacity to LOS C or better on all approaches during both peak hours. When modeled with all-way stop control, the westbound approach is projected to operate at LOS F during the PM peak hour with severe delay and 95th percentile queueing. This is due to the very high existing and projected westbound left-turning volumes. It is therefore not recommended to implement a stop condition for this movement. A roundabout is projected to operate at LOS A on all approaches.

Table 5: Future (2030) Capacity Calculations Summary – Improvements

| Intersection                   | Approach     | Future with Improvements (2030)                    |     |                    |                   |     |                    |
|--------------------------------|--------------|--|-----|--------------------|-------------------|-----|--------------------|
|                                |              | AM Peak  |     |                    | PM Peak           |     |                    |
|                                |              | Avg Delay (s/veh)                                  | LOS | 95th % Queue (veh) | Avg Delay (s/veh) | LOS | 95th % Queue (veh) |
| Intersection Control           |              | One-Way Stop-Control (NB), WB Left-Turn Lane       |     |                    |                   |     |                    |
| England Blvd & George Elmer Dr | NB           | 15.3   | C   | 4                  | 28.9              | D   | 4                  |
|                                | EB           | 0.0  | A   | 0                  | 0.0               | A   | 0                  |
|                                | WB           | 4.5  | A   | 1                  | 5.7               | A   | 2                  |
|                                | Intersection | 7.7  | A   | --                 | 8.3               | A   | --                 |
| Intersection Control           |              | One-Way Stop-Control (NB), WB LT, NB LT & RT Lanes |     |                    |                   |     |                    |
| England Blvd & George Elmer Dr | NB           | 14.6   | B   | 3                  | 21.2              | C   | 2                  |
|                                | EB           | 0.0  | A   | 0                  | 0.0               | A   | 0                  |
|                                | WB           | 4.5  | A   | 1                  | 5.7               | A   | 2                  |
|                                | Intersection | 7.4  | A   | --                 | 7.1               | A   | --                 |
| Intersection Control           |              | All-Way Stop-Control                               |     |                    |                   |     |                    |
| England Blvd & George Elmer Dr | NB           | 12.5   | B   | 3                  | 11.0              | B   | 2                  |
|                                | EB           | 12.2   | B   | 3                  | 10.5              | B   | 2                  |
|                                | WB           | 10.9   | B   | 2                  | 73.9              | F   | 21                 |
|                                | Intersection | 12.0   | B   | --                 | 53.5              | F   | --                 |
| Intersection Control           |              | Roundabout   |     |                    |                   |     |                    |
| England Blvd & George Elmer Dr | NB           | 7.6  | A   | 2                  | 4.6               | A   | 1                  |
|                                | EB           | 5.3  | A   | 1                  | 7.0               | A   | 1                  |
|                                | WB           | 3.9  | A   | 1                  | 9.8               | A   | 5                  |
|                                | Intersection | 6.0  | A   | --                 | 8.6               | A   | --                 |
| Intersection Control           |              | One-Way Stop-Control (SB), WB Right-Turn Lane      |     |                    |                   |     |                    |
| Mullan Rd & Chuck Wagon Dr     | SB           | 33.2   | D   | 4                  | 37.2              | E   | 3                  |
|                                | EB           | 0.2  | A   | 1                  | 1.5               | A   | 1                  |
|                                | WB           | 0.0  | A   | 0                  | 0.0               | A   | 0                  |
|                                | Intersection | 4.2  | A   | --                 | 2.9               | A   | --                 |
| Intersection Control           |              | Signalized   |     |                    |                   |     |                    |
| Mullan Rd & Chuck Wagon Dr     | SB           | 16.2   | B   | 2                  | 18.9              | B   | 1                  |
|                                | EB           | 8.0  | A   | 2                  | 4.1               | A   | 1                  |
|                                | WB           | 2.7  | A   | 1                  | 6.0               | A   | 2                  |
|                                | Intersection | 8.0  | A   | --                 | 6.3               | A   | --                 |
| Intersection Control           |              | Roundabout   |     |                    |                   |     |                    |
| Mullan Rd & Chuck Wagon Dr     | SB           | 3.8  | A   | 1                  | 6.8               | A   | 1                  |
|                                | EB           | 15.5   | C   | 9                  | 5.2               | A   | 2                  |
|                                | WB           | 4.5  | A   | 1                  | 16.0              | C   | 9                  |
|                                | Intersection | 12.1   | B   | --                 | 12.0              | B   | --                 |

Consideration should be given to installing a roundabout at the England Boulevard/George Elmer Drive intersection once the west leg is constructed to provide traffic calming as well as reserve capacity at the intersection. Construction of the turn lanes required to improve operations to LOS C would require a similar level of roadway widening to a roundabout without providing the additional capacity and safety benefits. Installation of the northbound left- and right-turn lanes with the

westbound left-turn lane and a stop sign on the south leg is recommended until the roundabout can be constructed. The conclusion to ultimately install a roundabout is consistent with the recommendation from the Mullan BUILD study. The City would need to secure right-of-way and Paisley Park Subdivision would be required to financially contribute in order for the roundabout construction to begin. With stop-control only on the northbound approach, vehicles on England Boulevard would not have an incentive to slow through the intersection, especially while area construction is ongoing and traffic volumes are relatively low. Installation of curb bulb-outs and raised crosswalks or a raised intersection would match the proposed cross-sections to the west, promote traffic calming and pedestrian safety, and should be considered until a roundabout is installed at this intersection. Roundabouts generally experience a lower number of crashes, better vehicle capacity results, and the most impactful traffic calming effects compared to stop-controlled intersections.

**Mullan Road/Chuck Wagon Drive:** The westbound right-turn slip lane currently is not striped and is long enough to fit only one or two vehicles. Delineating this turn lane would improve operations by making it more evident the turn lane is separate from the thru lane. If the slip lane was expanded to be full-length, it would allow for vehicles to enter the turn lane before decelerating which would reduce delay for westbound thru movements. This intersection is projected to operate at LOS C or better on all approaches with the installation of a traffic signal or a roundabout. As discussed in the traffic signal warrants section of this letter, traffic volumes at this intersection should be monitored with respect to the buildout timelines of the new connection to Mullan Road, the 44 Ranch Subdivision, and the Heron's Landing Subdivision and installation of a traffic signal or roundabout should be considered. The volumes added to the street network by all currently planned area developments are likely to exceed the combined existing capacity of the George Elmer Drive roundabout and the Chuck Wagon Drive intersections with Mullan Road as-is.

### **Recommendations**

Based on the above results, it is recommended that a westbound left-turn lane and northbound right- and left-turn lanes are installed with a stop sign on the south leg of the England Boulevard/George Elmer Drive intersection upon completion of the west leg as an interim measure until a roundabout can be constructed. This interim condition should include curb bulb-outs with consideration given to also including raised crosswalks or construction of a raised intersection to promote traffic calming. This configuration will provide sufficient vehicle capacity for the buildout of this area in the short term. A roundabout should ultimately be installed at this location, consistent with the recommendation in the Mullan BUILD study, which would provide adequate vehicle capacity and traffic calming measures to accommodate potential

Matt Hammerstein  
February 27, 2025  
Page 9

future connections to the north. The City will need to secure right-of-way for this roundabout and Paisley Park Subdivision will be required to contribute financially.

The intersection of Mullan Road/Chuck Wagon Drive should continue to be monitored through the construction of the 44 Ranch and Heron's Landing Subdivisions, which will supply the majority of new traffic to that intersection. Traffic should also be monitored at this intersection when the new connection to Mullan Road via Shindig Drive is completed. Based on long-term traffic forecasting, a traffic signal/roundabout should be considered at the intersection upon buildout of approximately 90 percent of the area developments. Prior to this, consideration should be given to striping and extending the existing westbound right-turn slip lane.

If you have any questions about this assessment, or if additional analysis is required, please feel free to contact me at 406-922-4306 or [jstaszczuk@sanbell.com](mailto:jstaszczuk@sanbell.com).

Sincerely,



Joey Staszczuk, PE, PTOE, RSP1  
Associate Principal | Community Transportation Studio Manager

SJW/ars/jhs/SG

Enc.

- Attachment A. Figures
- Attachment B. Traffic Count Data Worksheets
- Attachment C. Capacity Calculations - Existing Conditions (2025)
- Attachment D. Capacity Calculations - Future (2030)
- Attachment E. Warrants
- Attachment F. Capacity Calculations - Future Improved (2030)

P:250155\_Paisley\_Park\_Sub\_Traffic\_2.27.2025



## FIGURES

ATTACHMENT A

Intelligent Infrastructure.  
Enduring Communities.





**FIGURE 1:  
EXISTING CONDITIONS (2025)  
PEAK HOUR TRAFFIC VOLUMES**



1

70 (347)  
257 (71)

2

LOS A (A)  
(62) 9 (89) 136  
(21) 35 (348) 836 LOS B (A) 33 (123) 197 (728)  
LOS C (A) LOS A (A)

3

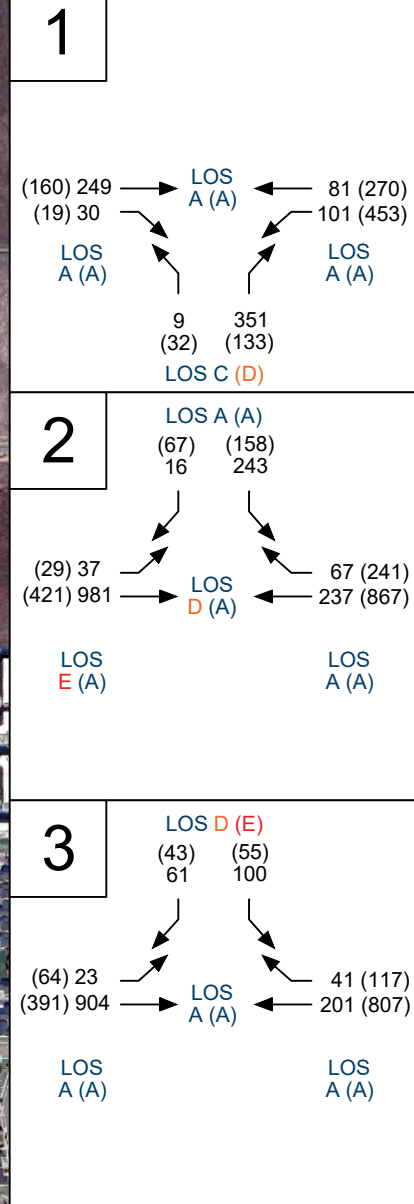
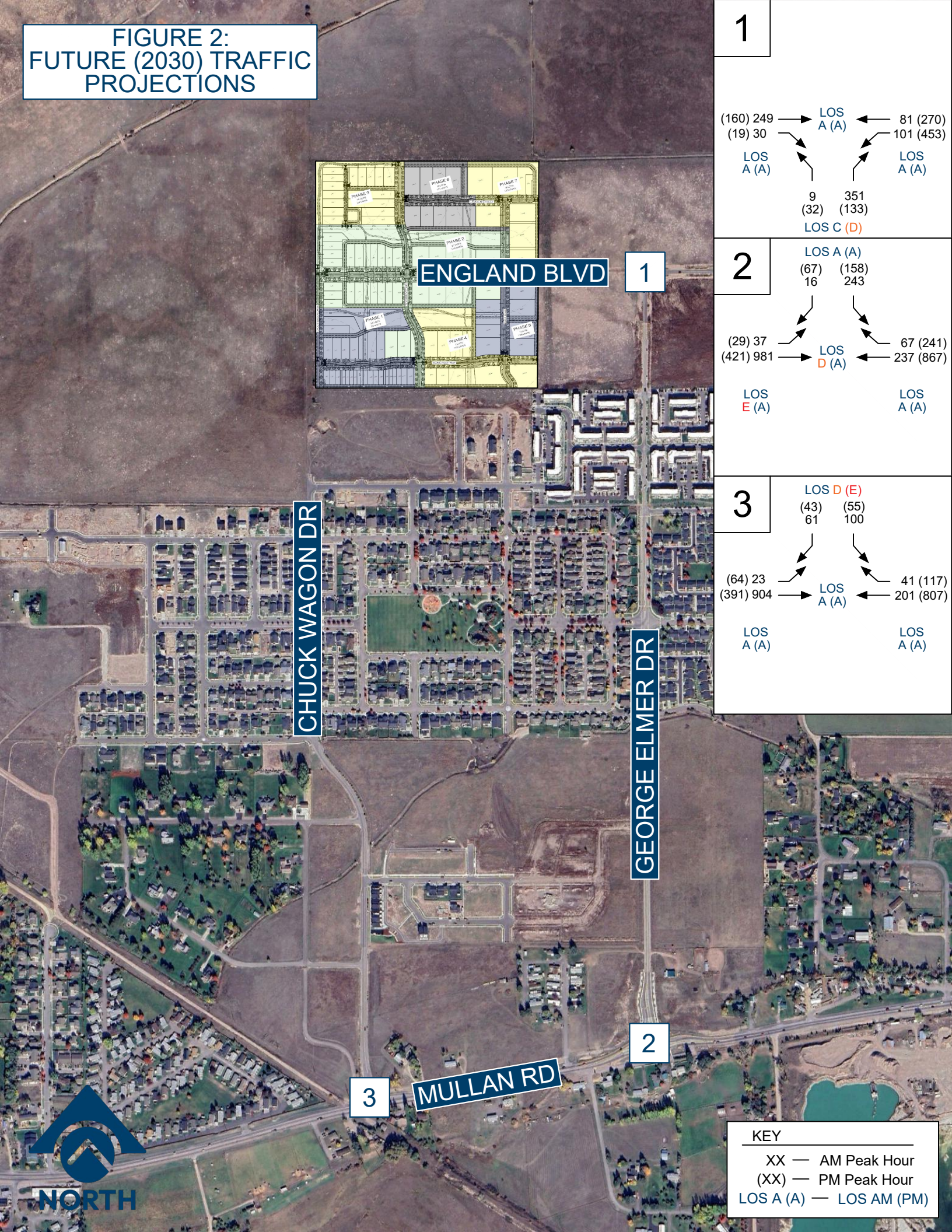
LOS C (C)  
(11) 11 (18) 42  
(10) 7 (347) 817 LOS A (A) 22 (54) 176 (726)  
LOS A (A) LOS A (A)

**KEY**

XX — AM Peak Hour  
(XX) — PM Peak Hour  
LOS A (A) — LOS AM (PM)



**FIGURE 2:  
FUTURE (2030) TRAFFIC  
PROJECTIONS**



**KEY**

XX — AM Peak Hour  
(XX) — PM Peak Hour  
LOS A (A) — LOS AM (PM)



## TRAFFIC COUNT DATA WORKSHEETS

ATTACHMENT B

Intelligent Infrastructure.  
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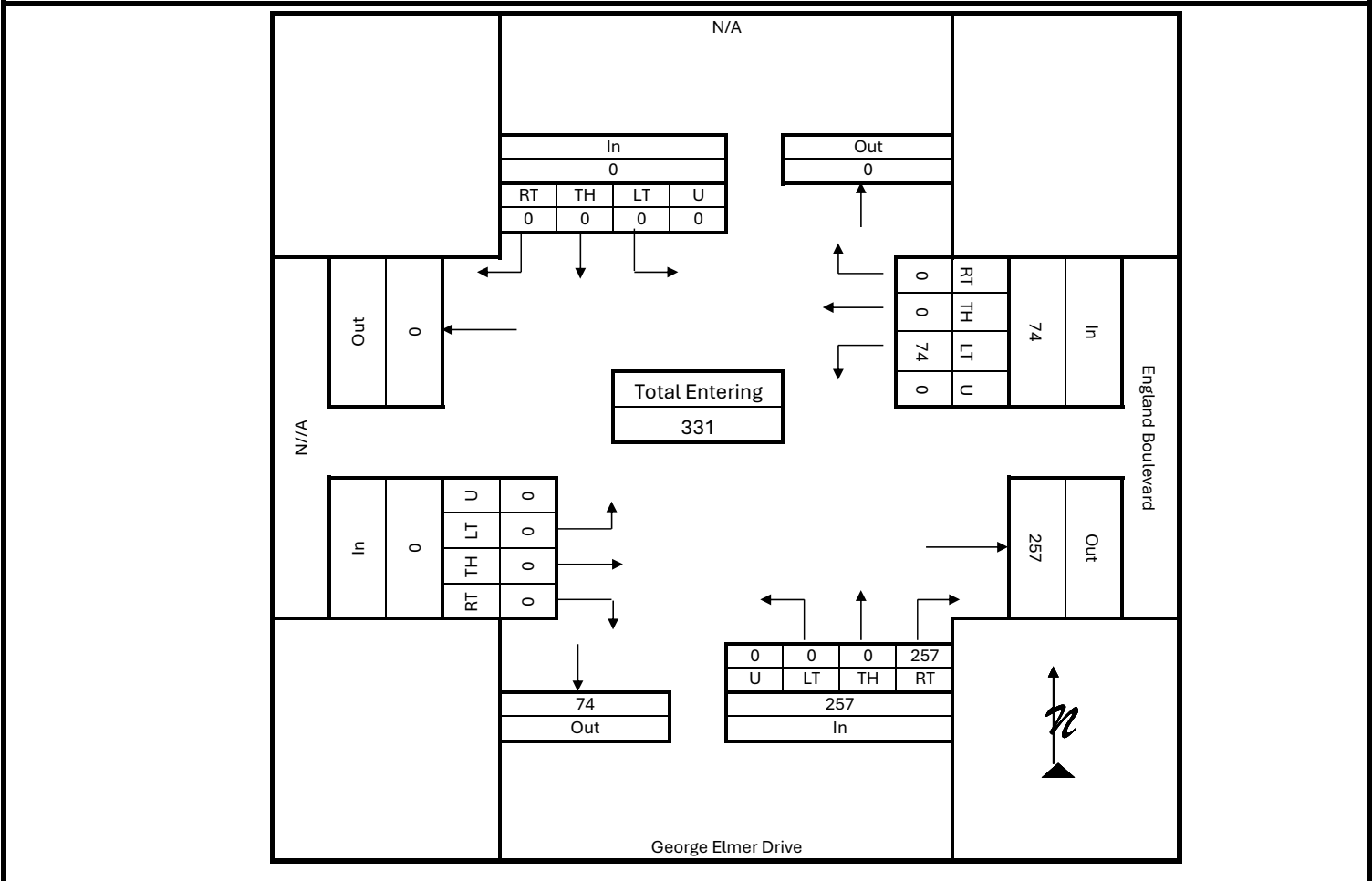
## INTERSECTION TURNING MOVEMENT COUNT SUMMARY

### General Information

|                     |                               |                      |                                |
|---------------------|-------------------------------|----------------------|--------------------------------|
| Counted By:         | Kole Ketterling               | Intersection:        | England Blvd & George Elmer Dr |
| Agency/Company:     | Sanbell                       | Jurisdiction:        | Missoula, MT /MDT              |
| Date Performed:     | Tuesday, February 11, 2025    | Project Description: | Paisley Park Subdivision       |
| Count Time Period:  | AM Peak Hour (7:30 - 8:30 AM) | East/West Street:    | England Boulevard              |
| Project Number:     | 250155                        |                      |                                |
| North/South Street: | George Elmer Drive            |                      |                                |

### Vehicle Volumes and Adjustments

|                | N/A<br>Southbound |      |      |        |       | George Elmer Drive<br>Northbound |      |      |        |       | N/A<br>Eastbound |      |      |        |       | England Boulevard<br>Westbound |      |      |        |       | Int.  |
|----------------|-------------------|------|------|--------|-------|----------------------------------|------|------|--------|-------|------------------|------|------|--------|-------|--------------------------------|------|------|--------|-------|-------|
| Start Time     | Right             | Thru | Left | U-turn | Total | Right                            | Thru | Left | U-turn | Total | Right            | Thru | Left | U-turn | Total | Right                          | Thru | Left | U-turn | Total | Total |
| Factor         | 1.00              | 1.00 | 1.00 | 1.00   |       | 1.00                             | 1.00 | 1.00 | 1.00   |       | 1.06             | 1.06 | 1.06 | 1.06   |       | 1.06                           | 1.06 | 1.06 | 1.06   |       |       |
| 7:30 AM        | 0                 | 0    | 0    | 0      | 0     | 66                               | 0    | 0    | 0      | 66    | 0                | 0    | 0    | 0      | 0     | 0                              | 0    | 13   | 0      | 13    | 79    |
| 7:45 AM        | 0                 | 0    | 0    | 0      | 0     | 92                               | 0    | 0    | 0      | 92    | 0                | 0    | 0    | 0      | 0     | 0                              | 0    | 16   | 0      | 16    | 108   |
| 8:00 AM        | 0                 | 0    | 0    | 0      | 0     | 67                               | 0    | 0    | 0      | 67    | 0                | 0    | 0    | 0      | 0     | 0                              | 0    | 18   | 0      | 18    | 85    |
| 8:15 AM        | 0                 | 0    | 0    | 0      | 0     | 32                               | 0    | 0    | 0      | 32    | 0                | 0    | 0    | 0      | 0     | 0                              | 0    | 27   | 0      | 27    | 59    |
| Grand Total    | 0                 | 0    | 0    | 0      | 0     | 257                              | 0    | 0    | 0      | 257   | 0                | 0    | 0    | 0      | 0     | 0                              | 0    | 74   | 0      | 74    | 331   |
| Medium Truck % | 0.0               | 0.0  | 0.0  | 0.0    | 0.0   | 0.0                              | 0.0  | 0.0  | 0.0    | 0.0   | 0.0              | 0.0  | 0.0  | 0.0    | 0.0   | 0.0                            | 0.0  | 0.0  | 0.0    | 0.0   |       |
| Heavy Truck %  | 0.0               | 0.0  | 0.0  | 0.0    | 0.0   | 0.0                              | 0.0  | 0.0  | 0.0    | 0.0   | 0.0              | 0.0  | 0.0  | 0.0    | 0.0   | 0.0                            | 0.0  | 0.0  | 0.0    | 0.0   |       |
| Total Truck %  | 0.0               | 0.0  | 0.0  | 0.0    | 0.0   | 0.0                              | 0.0  | 0.0  | 0.0    | 0.0   | 0.0              | 0.0  | 0.0  | 0.0    | 0.0   | 0.0                            | 0.0  | 0.0  | 0.0    | 0.0   |       |
| Total %        | 0.0               | 0.0  | 0.0  | 0.0    | 0.0   | 77.6                             | 0.0  | 0.0  | 0.0    | 77.6  | 0.0              | 0.0  | 0.0  | 0.0    | 0.0   | 0.0                            | 0.0  | 22.4 | 0.0    | 22.4  | 100.0 |
| PHF            | 1.00              | 1.00 | 1.00 |        |       | 0.70                             | 0.70 | 0.70 |        |       | 1.00             | 1.00 | 1.00 |        |       | 1.00                           | 1.00 | 1.00 |        |       | 0.76  |



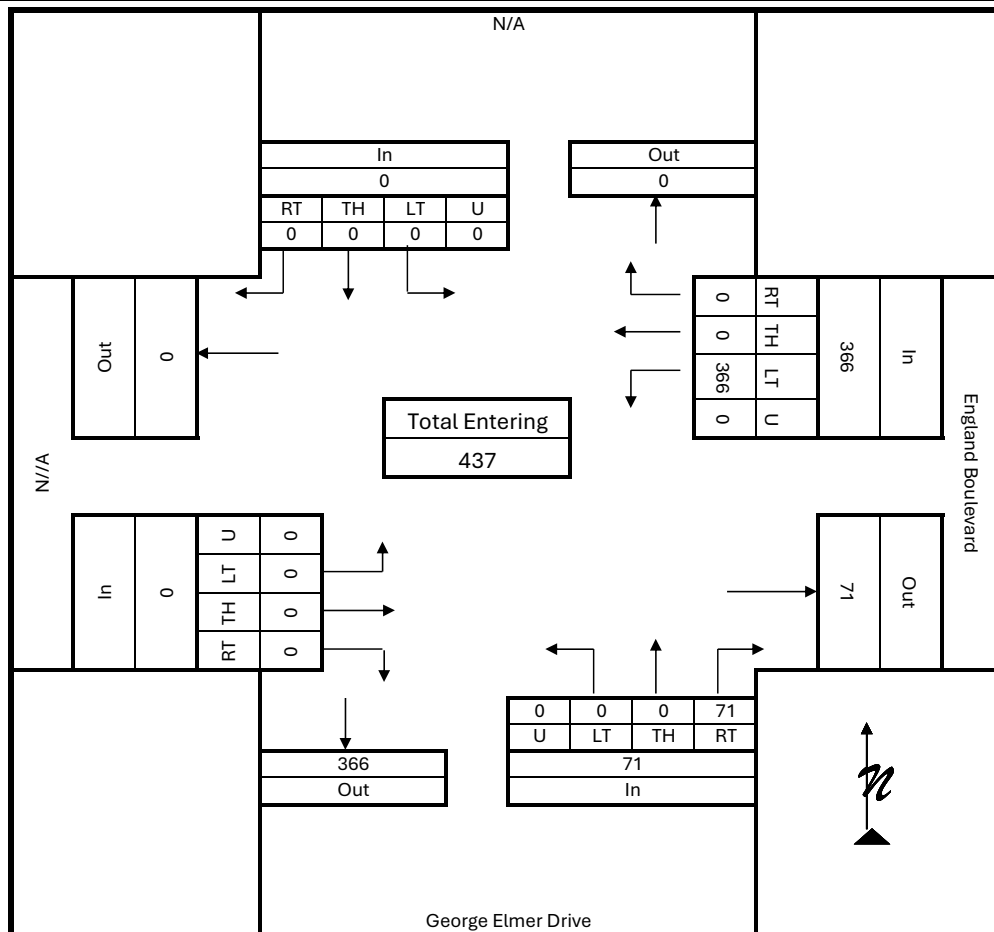
## INTERSECTION TURNING MOVEMENT COUNT SUMMARY

### General Information

|                     |                               |                      |                                |
|---------------------|-------------------------------|----------------------|--------------------------------|
| Counted By:         | Kole Ketterling               | Intersection:        | England Blvd & George Elmer Dr |
| Agency/Company:     | Sanbell                       | Jurisdiction:        | Missoula, MT /MDT              |
| Date Performed:     | Tuesday, February 11, 2025    | Project Description: | Paisley Park Subdivision       |
| Count Time Period:  | PM Peak Hour (5:00 - 6:00 PM) | East/West Street:    | England Boulevard              |
| Project Number:     | 250155                        |                      |                                |
| North/South Street: | George Elmer Drive            |                      |                                |

### Vehicle Volumes and Adjustments

|                | N/A<br>Southbound |      |      |        |       | George Elmer Drive<br>Northbound |      |      |        |       | N/A<br>Eastbound |      |      |        |       | England Boulevard<br>Westbound |      |      |        |       | Int.  |
|----------------|-------------------|------|------|--------|-------|----------------------------------|------|------|--------|-------|------------------|------|------|--------|-------|--------------------------------|------|------|--------|-------|-------|
| Start Time     | Right             | Thru | Left | U-turn | Total | Right                            | Thru | Left | U-turn | Total | Right            | Thru | Left | U-turn | Total | Right                          | Thru | Left | U-turn | Total | Total |
| Factor         | 1.00              | 1.00 | 1.00 | 1.00   |       | 1.00                             | 1.00 | 1.00 | 1.00   |       | 1.06             | 1.06 | 1.06 | 1.06   |       | 1.06                           | 1.06 | 1.06 | 1.06   |       |       |
| 5:00 PM        | 0                 | 0    | 0    | 0      | 0     | 21                               | 0    | 0    | 0      | 21    | 0                | 0    | 0    | 0      | 0     | 0                              | 0    | 120  | 0      | 120   | 141   |
| 5:15 PM        | 0                 | 0    | 0    | 0      | 0     | 16                               | 0    | 0    | 0      | 16    | 0                | 0    | 0    | 0      | 0     | 0                              | 0    | 89   | 0      | 89    | 105   |
| 5:30 PM        | 0                 | 0    | 0    | 0      | 0     | 11                               | 0    | 0    | 0      | 11    | 0                | 0    | 0    | 0      | 0     | 0                              | 0    | 94   | 0      | 94    | 105   |
| 5:45 PM        | 0                 | 0    | 0    | 0      | 0     | 23                               | 0    | 0    | 0      | 23    | 0                | 0    | 0    | 0      | 0     | 0                              | 0    | 63   | 0      | 63    | 86    |
| Grand Total    | 0                 | 0    | 0    | 0      | 0     | 71                               | 0    | 0    | 0      | 71    | 0                | 0    | 0    | 0      | 0     | 0                              | 0    | 366  | 0      | 366   | 437   |
| Medium Truck % | 0.0               | 0.0  | 0.0  | 0.0    | 0.0   | 0.0                              | 0.0  | 0.0  | 0.0    | 0.0   | 0.0              | 0.0  | 0.0  | 0.0    | 0.0   | 0.0                            | 0.0  | 0.0  | 0.0    | 0.0   |       |
| Heavy Truck %  | 0.0               | 0.0  | 0.0  | 0.0    | 0.0   | 0.0                              | 0.0  | 0.0  | 0.0    | 0.0   | 0.0              | 0.0  | 0.0  | 0.0    | 0.0   | 0.0                            | 0.0  | 0.0  | 0.0    | 0.0   |       |
| Total Truck %  | 0.0               | 0.0  | 0.0  | 0.0    | 0.0   | 0.0                              | 0.0  | 0.0  | 0.0    | 0.0   | 0.0              | 0.0  | 0.0  | 0.0    | 0.0   | 0.0                            | 0.0  | 0.0  | 0.0    | 0.0   |       |
| Total %        | 0.0               | 0.0  | 0.0  | 0.0    | 0.0   | 16.2                             | 0.0  | 0.0  | 0.0    | 16.2  | 0.0              | 0.0  | 0.0  | 0.0    | 0.0   | 0.0                            | 0.0  | 83.8 | 0.0    | 83.8  | 100.0 |
| PHF            | 1.00              | 1.00 | 1.00 |        |       | 0.85                             | 0.85 | 0.85 |        |       | 1.00             | 1.00 | 1.00 |        |       | 0.78                           | 0.78 | 0.78 |        |       | 0.79  |



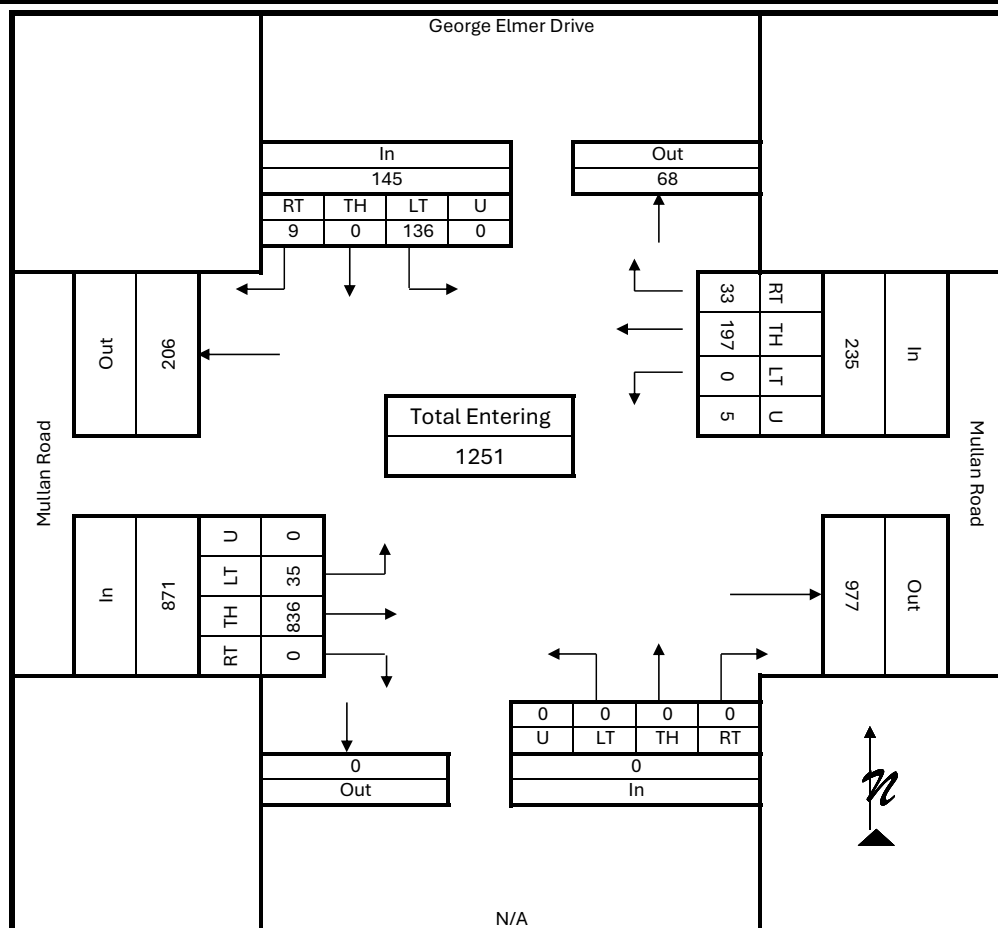
## INTERSECTION TURNING MOVEMENT COUNT SUMMARY

### General Information

|                     |                               |                      |                             |
|---------------------|-------------------------------|----------------------|-----------------------------|
| Counted By:         | Kole Ketterling               | Intersection:        | Mullan Rd & George Elmer Dr |
| Agency/Company:     | Sanbell                       | Jurisdiction:        | Missoula, MT /MDT           |
| Date Performed:     | Tuesday, February 11, 2025    |                      |                             |
| Count Time Period:  | AM Peak Hour (7:30 - 8:30 AM) |                      |                             |
| Project Number:     | 250155                        | Project Description: | Paisley Park Subdivision    |
| North/South Street: | George Elmer Drive            | East/West Street:    | Mullan Road                 |

### Vehicle Volumes and Adjustments

|                | George Elmer Drive<br>Southbound |      |      |        |       | N/A<br>Northbound |      |      |        |       | Mullan Road<br>Eastbound |      |      |        |       | Mullan Road<br>Westbound |      |      |        |       | Int.<br>Total |
|----------------|----------------------------------|------|------|--------|-------|-------------------|------|------|--------|-------|--------------------------|------|------|--------|-------|--------------------------|------|------|--------|-------|---------------|
| Start Time     | Right                            | Thru | Left | U-turn | Total | Right             | Thru | Left | U-turn | Total | Right                    | Thru | Left | U-turn | Total | Right                    | Thru | Left | U-turn | Total |               |
| Factor         | 1.00                             | 1.00 | 1.00 | 1.00   |       | 1.00              | 1.00 | 1.00 | 1.00   |       | 1.06                     | 1.06 | 1.06 | 1.06   |       | 1.06                     | 1.06 | 1.06 | 1.06   |       |               |
| 7:30 AM        | 3                                | 0    | 42   | 0      | 45    | 0                 | 0    | 0    | 0      | 0     | 0                        | 234  | 8    | 0      | 242   | 10                       | 43   | 0    | 1      | 54    | 341           |
| 7:45 AM        | 1                                | 0    | 33   | 0      | 34    | 0                 | 0    | 0    | 0      | 0     | 0                        | 228  | 17   | 0      | 245   | 6                        | 35   | 0    | 0      | 41    | 320           |
| 8:00 AM        | 4                                | 0    | 30   | 0      | 34    | 0                 | 0    | 0    | 0      | 0     | 0                        | 206  | 8    | 0      | 214   | 5                        | 49   | 0    | 2      | 56    | 304           |
| 8:15 AM        | 1                                | 0    | 31   | 0      | 32    | 0                 | 0    | 0    | 0      | 0     | 0                        | 168  | 2    | 0      | 170   | 12                       | 70   | 0    | 2      | 84    | 286           |
| Grand Total    | 9                                | 0    | 136  | 0      | 145   | 0                 | 0    | 0    | 0      | 0     | 0                        | 836  | 35   | 0      | 871   | 33                       | 197  | 0    | 5      | 235   | 1251          |
| Medium Truck % | 11.1                             | 0.0  | 0.0  | 0.0    | 0.7   | 0.0               | 0.0  | 0.0  | 0.0    | 0.0   | 0.0                      | 1.6  | 2.9  | 0.0    | 1.6   | 0.0                      | 4.6  | 0.0  | 20.0   | 4.3   |               |
| Heavy Truck %  | 0.0                              | 0.0  | 0.0  | 0.0    | 0.0   | 0.0               | 0.0  | 0.0  | 0.0    | 0.0   | 0.0                      | 0.0  | 0.0  | 0.0    | 0.0   | 0.0                      | 0.0  | 0.0  | 0.0    | 0.0   |               |
| Total Truck %  | 11.1                             | 0.0  | 0.0  | 0.0    | 0.7   | 0.0               | 0.0  | 0.0  | 0.0    | 0.0   | 0.0                      | 1.6  | 2.9  | 0.0    | 1.6   | 0.0                      | 4.6  | 0.0  | 20.0   | 4.3   |               |
| Total %        | 0.7                              | 0.0  | 10.9 | 0.0    | 11.6  | 0.0               | 0.0  | 0.0  | 0.0    | 0.0   | 0.0                      | 66.8 | 2.8  | 0.0    | 69.6  | 2.6                      | 15.7 | 0.0  | 0.4    | 18.8  | 100.0         |
| PHF            | 0.81                             | 0.81 | 0.81 |        |       | 1.00              | 1.00 | 1.00 |        |       | 0.90                     | 0.90 | 0.90 |        |       | 1.00                     | 1.00 | 1.00 |        |       | 0.92          |



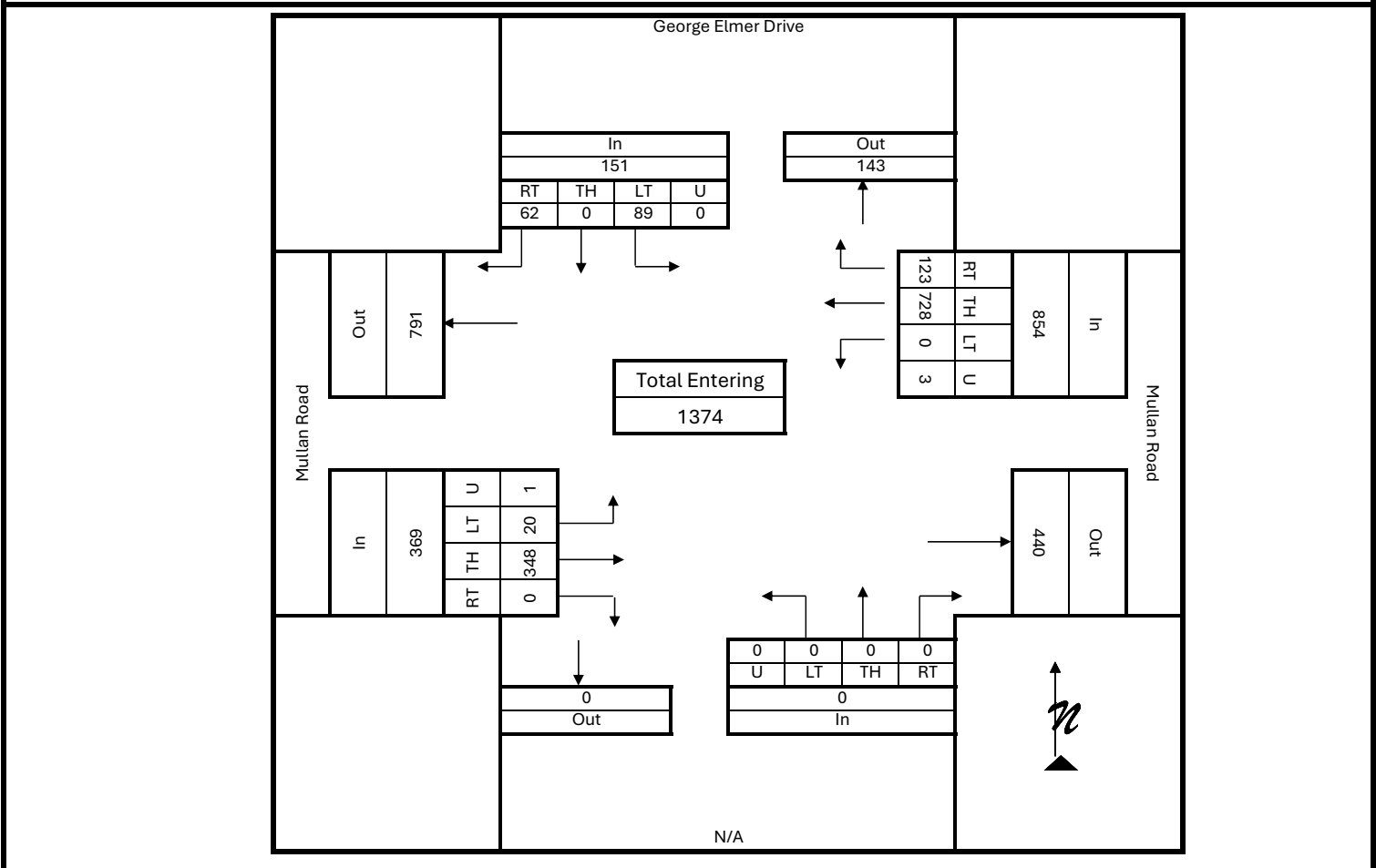
## INTERSECTION TURNING MOVEMENT COUNT SUMMARY

### General Information

|                     |                               |                      |                             |
|---------------------|-------------------------------|----------------------|-----------------------------|
| Counted By:         | Kole Ketterling               | Intersection:        | Mullan Rd & George Elmer Dr |
| Agency/Company:     | Sanbell                       | Jurisdiction:        | Missoula, MT /MDT           |
| Date Performed:     | Tuesday, February 11, 2025    |                      |                             |
| Count Time Period:  | PM Peak Hour (5:00 - 6:00 PM) |                      |                             |
| Project Number:     | 250155                        | Project Description: | Paisley Park Subdivision    |
| North/South Street: | George Elmer Drive            | East/West Street:    | Mullan Road                 |

### Vehicle Volumes and Adjustments

|                | George Elmer Drive<br>Southbound |      |      |        |       | N/A<br>Northbound |      |      |        |       | Mullan Road<br>Eastbound |      |      |        |       | Mullan Road<br>Westbound |      |      |        |       | Int.<br>Total |
|----------------|----------------------------------|------|------|--------|-------|-------------------|------|------|--------|-------|--------------------------|------|------|--------|-------|--------------------------|------|------|--------|-------|---------------|
| Start Time     | Right                            | Thru | Left | U-turn | Total | Right             | Thru | Left | U-turn | Total | Right                    | Thru | Left | U-turn | Total | Right                    | Thru | Left | U-turn | Total |               |
| Factor         | 1.00                             | 1.00 | 1.00 | 1.00   |       | 1.00              | 1.00 | 1.00 | 1.00   |       | 1.06                     | 1.06 | 1.06 | 1.06   |       | 1.06                     | 1.06 | 1.06 | 1.06   |       |               |
| 5:00 PM        | 13                               | 0    | 15   | 0      | 28    | 0                 | 0    | 0    | 0      | 0     | 0                        | 89   | 6    | 0      | 95    | 29                       | 178  | 0    | 1      | 208   | 331           |
| 5:15 PM        | 14                               | 0    | 24   | 0      | 38    | 0                 | 0    | 0    | 0      | 0     | 0                        | 67   | 5    | 0      | 72    | 33                       | 187  | 0    | 0      | 220   | 330           |
| 5:30 PM        | 21                               | 0    | 23   | 0      | 44    | 0                 | 0    | 0    | 0      | 0     | 0                        | 95   | 2    | 0      | 97    | 27                       | 171  | 0    | 2      | 200   | 341           |
| 5:45 PM        | 14                               | 0    | 27   | 0      | 41    | 0                 | 0    | 0    | 0      | 0     | 0                        | 97   | 7    | 1      | 105   | 34                       | 192  | 0    | 0      | 226   | 372           |
| Grand Total    | 62                               | 0    | 89   | 0      | 151   | 0                 | 0    | 0    | 0      | 0     | 0                        | 348  | 20   | 1      | 369   | 123                      | 728  | 0    | 3      | 854   | 1374          |
| Medium Truck % | 1.6                              | 0.0  | 0.0  | 0.0    | 0.7   | 0.0               | 0.0  | 0.0  | 0.0    | 0.0   | 0.0                      | 0.0  | 0.0  | 0.0    | 0.0   | 0.0                      | 0.1  | 0.0  | 0.0    | 0.1   |               |
| Heavy Truck %  | 0.0                              | 0.0  | 0.0  | 0.0    | 0.0   | 0.0               | 0.0  | 0.0  | 0.0    | 0.0   | 0.0                      | 0.0  | 0.0  | 0.0    | 0.0   | 0.0                      | 0.0  | 0.0  | 0.0    | 0.0   |               |
| Total Truck %  | 1.6                              | 0.0  | 0.0  | 0.0    | 0.7   | 0.0               | 0.0  | 0.0  | 0.0    | 0.0   | 0.0                      | 0.0  | 0.0  | 0.0    | 0.0   | 0.0                      | 0.1  | 0.0  | 0.0    | 0.1   |               |
| Total %        | 4.5                              | 0.0  | 6.5  | 0.0    | 11.0  | 0.0               | 0.0  | 0.0  | 0.0    | 0.0   | 0.0                      | 25.3 | 1.5  | 0.1    | 26.9  | 9.0                      | 53.0 | 0.0  | 0.2    | 62.2  | 100.0         |
| PHF            | 0.92                             | 0.92 | 0.92 |        |       | 1.00              | 1.00 | 1.00 |        |       | 0.88                     | 0.88 | 0.88 |        |       | 0.94                     | 0.94 | 0.94 |        |       | 0.92          |



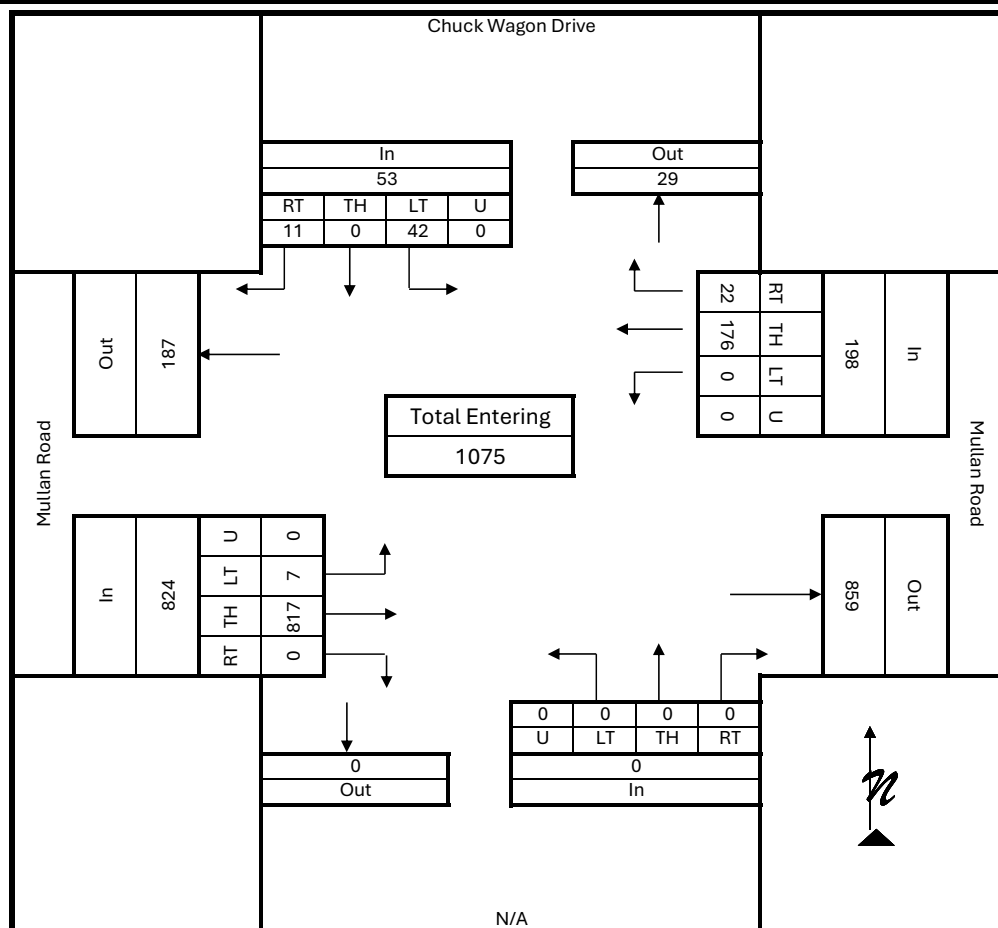
## INTERSECTION TURNING MOVEMENT COUNT SUMMARY

### General Information

|                     |                               |                      |                            |
|---------------------|-------------------------------|----------------------|----------------------------|
| Counted By:         | Kole Ketterling               | Intersection:        | Mullan Rd & Chuck Wagon Dr |
| Agency/Company:     | Sanbell                       | Jurisdiction:        | Missoula, MT /MDT          |
| Date Performed:     | Tuesday, February 11, 2025    |                      |                            |
| Count Time Period:  | AM Peak Hour (7:30 - 8:30 AM) |                      |                            |
| Project Number:     | 250155                        | Project Description: | Paisley Park Subdivision   |
| North/South Street: | Chuck Wagon Drive             | East/West Street:    | Mullan Road                |

### Vehicle Volumes and Adjustments

|                | Chuck Wagon Drive<br>Southbound |      |      |        |       | N/A<br>Northbound |      |      |        |       | Mullan Road<br>Eastbound |      |      |        |       | Mullan Road<br>Westbound |      |      |        |       | Int.<br>Total |
|----------------|---------------------------------|------|------|--------|-------|-------------------|------|------|--------|-------|--------------------------|------|------|--------|-------|--------------------------|------|------|--------|-------|---------------|
| Start Time     | Right                           | Thru | Left | U-turn | Total | Right             | Thru | Left | U-turn | Total | Right                    | Thru | Left | U-turn | Total | Right                    | Thru | Left | U-turn | Total |               |
| Factor         | 1.00                            | 1.00 | 1.00 | 1.00   |       | 1.00              | 1.00 | 1.00 | 1.00   |       | 1.06                     | 1.06 | 1.06 | 1.06   |       | 1.06                     | 1.06 | 1.06 | 1.06   |       |               |
| 7:30 AM        | 3                               | 0    | 11   | 0      | 14    | 0                 | 0    | 0    | 0      | 0     | 0                        | 230  | 3    | 0      | 233   | 6                        | 39   | 0    | 0      | 45    | 292           |
| 7:45 AM        | 5                               | 0    | 9    | 0      | 14    | 0                 | 0    | 0    | 0      | 0     | 0                        | 229  | 2    | 0      | 231   | 5                        | 32   | 0    | 0      | 37    | 282           |
| 8:00 AM        | 2                               | 0    | 13   | 0      | 15    | 0                 | 0    | 0    | 0      | 0     | 0                        | 207  | 2    | 0      | 209   | 8                        | 39   | 0    | 0      | 47    | 271           |
| 8:15 AM        | 1                               | 0    | 9    | 0      | 10    | 0                 | 0    | 0    | 0      | 0     | 0                        | 151  | 0    | 0      | 151   | 3                        | 66   | 0    | 0      | 69    | 230           |
| Grand Total    | 11                              | 0    | 42   | 0      | 53    | 0                 | 0    | 0    | 0      | 0     | 0                        | 817  | 7    | 0      | 824   | 22                       | 176  | 0    | 0      | 198   | 1075          |
| Medium Truck % | 0.0                             | 0.0  | 0.0  | 0.0    | 0.0   | 0.0               | 0.0  | 0.0  | 0.0    | 0.0   | 0.0                      | 1.7  | 0.0  | 0.0    | 1.7   | 0.0                      | 5.7  | 0.0  | 0.0    | 5.1   |               |
| Heavy Truck %  | 0.0                             | 0.0  | 0.0  | 0.0    | 0.0   | 0.0               | 0.0  | 0.0  | 0.0    | 0.0   | 0.0                      | 0.0  | 0.0  | 0.0    | 0.0   | 0.0                      | 0.0  | 0.0  | 0.0    | 0.0   |               |
| Total Truck %  | 0.0                             | 0.0  | 0.0  | 0.0    | 0.0   | 0.0               | 0.0  | 0.0  | 0.0    | 0.0   | 0.0                      | 1.7  | 0.0  | 0.0    | 1.7   | 0.0                      | 5.7  | 0.0  | 0.0    | 5.1   |               |
| Total %        | 1.0                             | 0.0  | 3.9  | 0.0    | 4.9   | 0.0               | 0.0  | 0.0  | 0.0    | 0.0   | 0.0                      | 76.0 | 0.7  | 0.0    | 76.7  | 2.0                      | 16.4 | 0.0  | 0.0    | 18.4  | 100.0         |
| PHF            | 0.95                            | 0.95 | 0.95 |        |       | 1.00              | 1.00 | 1.00 |        |       | 0.88                     | 0.88 | 0.88 |        |       | 1.00                     | 1.00 | 1.00 |        |       | 0.92          |



|                     |                               |                      |                            |
|---------------------|-------------------------------|----------------------|----------------------------|
| Counted By:         | Kole Ketterling               | Intersection:        | Mullan Rd & Chuck Wagon Dr |
| Agency/Company:     | Sanbell                       |                      |                            |
| Date Performed:     | Tuesday, February 11, 2025    | Jurisdiction:        | Missoula, MT /MDT          |
| Count Time Period:  | PM Peak Hour (5:00 - 6:00 PM) |                      |                            |
| Project Number:     | 250155                        | Project Description: | Paisley Park Subdivision   |
| North/South Street: | Chuck Wagon Drive             | East/West Street:    | Mullan Road                |

|                | Chuck Wagon Drive Southbound |      |      |        |       | N/A Northbound |      |      |        |       | Mullan Road Eastbound |      |      |        |       | Mullan Road Westbound |      |      |        |       | Int.  |
|----------------|------------------------------|------|------|--------|-------|----------------|------|------|--------|-------|-----------------------|------|------|--------|-------|-----------------------|------|------|--------|-------|-------|
| Start Time     | Right                        | Thru | Left | U-turn | Total | Right          | Thru | Left | U-turn | Total | Right                 | Thru | Left | U-turn | Total | Right                 | Thru | Left | U-turn | Total | Total |
| Factor         | 1.00                         | 1.00 | 1.00 | 1.00   |       | 1.00           | 1.00 | 1.00 | 1.00   |       | 1.06                  | 1.06 | 1.06 | 1.06   |       | 1.06                  | 1.06 | 1.06 | 1.06   |       |       |
| 5:00 PM        | 2                            | 0    | 6    | 0      | 8     | 0              | 0    | 0    | 0      | 0     | 0                     | 88   | 5    | 0      | 93    | 11                    | 177  | 0    | 0      | 188   | 289   |
| 5:15 PM        | 5                            | 0    | 6    | 0      | 11    | 0              | 0    | 0    | 0      | 0     | 0                     | 67   | 3    | 0      | 70    | 22                    | 180  | 0    | 0      | 202   | 283   |
| 5:30 PM        | 3                            | 0    | 3    | 0      | 6     | 0              | 0    | 0    | 0      | 0     | 0                     | 91   | 0    | 0      | 91    | 11                    | 179  | 0    | 0      | 190   | 287   |
| 5:45 PM        | 1                            | 0    | 3    | 0      | 4     | 0              | 0    | 0    | 0      | 0     | 0                     | 101  | 2    | 0      | 103   | 10                    | 190  | 0    | 0      | 200   | 307   |
| Grand Total    | 11                           | 0    | 18   | 0      | 29    | 0              | 0    | 0    | 0      | 0     | 0                     | 347  | 10   | 0      | 357   | 54                    | 726  | 0    | 0      | 780   | 1166  |
| Medium Truck % | 9.1                          | 0.0  | 0.0  | 0.0    | 3.4   | 0.0            | 0.0  | 0.0  | 0.0    | 0.0   | 0.0                   | 0.0  | 0.0  | 0.0    | 0.0   | 0.0                   | 0.3  | 0.0  | 0.0    | 0.3   |       |
| Heavy Truck %  | 0.0                          | 0.0  | 0.0  | 0.0    | 0.0   | 0.0            | 0.0  | 0.0  | 0.0    | 0.0   | 0.0                   | 0.0  | 0.0  | 0.0    | 0.0   | 0.0                   | 0.0  | 0.0  | 0.0    | 0.0   |       |
| Total Truck %  | 9.1                          | 0.0  | 0.0  | 0.0    | 3.4   | 0.0            | 0.0  | 0.0  | 0.0    | 0.0   | 0.0                   | 0.0  | 0.0  | 0.0    | 0.0   | 0.0                   | 0.3  | 0.0  | 0.0    | 0.3   |       |
| Total %        | 0.9                          | 0.0  | 1.5  | 0.0    | 2.5   | 0.0            | 0.0  | 0.0  | 0.0    | 0.0   | 0.0                   | 29.8 | 0.9  | 0.0    | 30.6  | 4.6                   | 62.3 | 0.0  | 0.0    | 66.9  | 100.0 |
| PHF            | 1.00                         | 1.00 | 1.00 |        |       | 1.00           | 1.00 | 1.00 |        |       | 0.86                  | 0.86 | 0.86 |        |       | 0.97                  | 0.97 | 0.97 |        |       | 0.95  |



**CAPACITY CALCULATIONS –  
EXISTING CONDITIONS (2025)**

**ATTACHMENT C**

Intelligent Infrastructure.  
Enduring Communities.





| Intersection                   | Approach     | Existing (2025)           |     |                       |                      |     |                       |
|--------------------------------|--------------|---------------------------|-----|-----------------------|----------------------|-----|-----------------------|
|                                |              | AM Peak                   |     |                       | PM Peak              |     |                       |
|                                |              | Avg Delay<br>(s/veh)      | LOS | 95th % Queue<br>(veh) | Avg Delay<br>(s/veh) | LOS | 95th % Queue<br>(veh) |
| Intersection Control           |              | Roundabout                |     |                       |                      |     |                       |
| Mullan Rd & George<br>Elmer Dr | SB           | 4.2                       | A   | 1                     | 6.6                  | A   | 1                     |
|                                | EB           | 15.8                      | C   | 9                     | 5.3                  | A   | 2                     |
|                                | WB           | 3.8                       | A   | 1                     | 7.8                  | A   | 4                     |
|                                | Intersection | 12.3                      | B   | --                    | 7.0                  | A   | --                    |
| Intersection Control           |              | One-Way Stop-Control (SB) |     |                       |                      |     |                       |
| Mullan Rd & Chuck<br>Wagon Dr  | SB           | 21.4                      | C   | 1                     | 20.7                 | C   | 1                     |
|                                | EB           | 0.1                       | A   | 1                     | 0.3                  | A   | 1                     |
|                                | WB           | 0.0                       | A   | 0                     | 0.0                  | A   | 0                     |
|                                | Intersection | 1.1                       | A   | --                    | 0.6                  | A   | --                    |

### Intersection Level Of Service Report

#### Intersection 2: Mullan Rd & George Elmer Dr




Control Type:  
Analysis Method:  
Analysis Period:

Roundabout  
HCM 7th Edition  
15 minutes

Delay (sec / veh):  
Level Of Service:

12.3  
B

#### Intersection Setup

| Name                         | George Elmer Drive  |        | Mullan Road  |        | Mullan Road   |        |
|------------------------------|---|--------|--|--------|---|--------|
| Approach                     | Southbound  |        | Eastbound  |        | Westbound   |        |
| Lane Configuration           |  |        |  |        |  |        |
| Turning Movement             | Left  | Right  | Left   | Thru   | Thru  | Right  |
| Lane Width [ft]              | 12.00   | 12.00  | 12.00  | 12.00  | 12.00   | 12.00  |
| No. of Lanes in Entry Pocket | 0   | 1      | 1  | 0      | 0   | 1      |
| Entry Pocket Length [ft]     | 100.00  | 100.00 | 100.00   | 100.00 | 100.00  | 100.00 |
| No. of Lanes in Exit Pocket  | 0   | 0      | 0  | 0      | 0   | 0      |
| Exit Pocket Length [ft]      | 0.00  | 0.00   | 0.00   | 0.00   | 0.00  | 0.00   |
| Speed [mph]                  | 30.00   |        | 45.00  |        | 45.00   |        |
| Grade [%]                    | 0.00  |        | 0.00   |        | 0.00  |        |
| Crosswalk                    | No  |        | No   |        | No  |        |

#### Volumes

| Name                                    | George Elmer Drive |        | Mullan Road |        | Mullan Road |        |
|---|--------------------|--------|-------------|--------|-------------|--------|
| Base Volume Input [veh/h]               | 136                | 9      | 35          | 836    | 197         | 33     |
| Base Volume Adjustment Factor           | 1.0000             | 1.0000 | 1.0000      | 1.0000 | 1.0000      | 1.0000 |
| Heavy Vehicles Percentage [%]           | 0.00               | 5.00   | 2.90        | 1.60   | 4.60        | 0.00   |
| Proportion of CAVs [%]                  | 0.00               |        |             |        |             |        |
| Growth Factor                           | 1.0000             | 1.0000 | 1.0000      | 1.0000 | 1.0000      | 1.0000 |
| In-Process Volume [veh/h]               | 0                  | 0      | 0           | 0      | 0           | 0      |
| Site-Generated Trips [veh/h]            | 0                  | 0      | 0           | 0      | 0           | 0      |
| Diverted Trips [veh/h]                  | 0                  | 0      | 0           | 0      | 0           | 0      |
| Pass-by Trips [veh/h]                   | 0                  | 0      | 0           | 0      | 0           | 0      |
| Existing Site Adjustment Volume [veh/h] | 0                  | 0      | 0           | 0      | 0           | 0      |
| Other Volume [veh/h]                    | 0                  | 0      | 0           | 0      | 0           | 0      |
| Total Hourly Volume [veh/h]             | 136                | 9      | 35          | 836    | 197         | 33     |
| Peak Hour Factor                        | 0.8100             | 0.8100 | 0.9000      | 0.9000 | 1.0000      | 1.0000 |
| Other Adjustment Factor                 | 1.0000             | 1.0000 | 1.0000      | 1.0000 | 1.0000      | 1.0000 |
| Total 15-Minute Volume [veh/h]          | 42                 | 3      | 10          | 232    | 49          | 8      |
| Total Analysis Volume [veh/h]           | 168                | 11     | 39          | 929    | 197         | 33     |
| Pedestrian Volume [ped/h]               | 0                  |        | 0           |        | 0           |        |

**Intersection Settings**

|   |     |    |     |     |      |    |
|---|-----|----|-----|-----|------|----|
| Number of Conflicting Circulating Lanes | 1   |    | 1   |     | 1    |    |
| Circulating Flow Rate [veh/h]           | 206 |    | 168 |     | 40   |    |
| Exiting Flow Rate [veh/h]               | 73  |    | 218 |     | 1112 |    |
| Demand Flow Rate [veh/h]                | 136 | 9  | 35  | 836 | 197  | 33 |
| Adjusted Demand Flow Rate [veh/h]       | 168 | 11 | 39  | 929 | 197  | 33 |

**Lanes**

|  |         |         |         |         |         |         |
|--|---------|---------|---------|---------|---------|---------|
| Overwrite Calculated Critical Headway      | No      | No      | No      | No      | No      | No      |
| User-Defined Critical Headway [s]          | 4.00    | 4.00    | 4.00    | 4.00    | 4.00    | 4.00    |
| Overwrite Calculated Follow-Up Time        | No      | No      | No      | No      | No      | No      |
| User-Defined Follow-Up Time [s]            | 3.00    | 3.00    | 3.00    | 3.00    | 3.00    | 3.00    |
| A (intercept)                              | 1420.00 | 1420.00 | 1420.00 | 1420.00 | 1420.00 | 1420.00 |
| B (coefficient)                            | 0.00091 | 0.00091 | 0.00091 | 0.00091 | 0.00091 | 0.00091 |
| HV Adjustment Factor                       | 1.00    | 0.95    | 0.97    | 0.98    | 0.96    | 1.00    |
| Entry Flow Rate [veh/h]                    | 168     | 12      | 41      | 944     | 207     | 33      |
| Capacity of Entry and Bypass Lanes [veh/h] | 1178    | 1178    | 1219    | 1219    | 1370    | 1370    |
| Pedestrian Impedance                       | 1.00    | 1.00    | 1.00    | 1.00    | 1.00    | 1.00    |
| Capacity per Entry Lane [veh/h]            | 1178    | 1122    | 1185    | 1200    | 1309    | 1370    |
| X, volume / capacity                       | 0.14    | 0.01    | 0.03    | 0.77    | 0.15    | 0.02    |

**Movement, Approach, & Intersection Results**




|                                    |       |      |       |        |       |      |
|------------------------------------|-------|------|-------|--------|-------|------|
| Lane LOS                           | A     | A    | A     | C      | A     | A    |
| 95th-Percentile Queue Length [veh] | 0.50  | 0.03 | 0.10  | 8.28   | 0.53  | 0.07 |
| 95th-Percentile Queue Length [ft]  | 12.44 | 0.74 | 2.55  | 206.93 | 13.24 | 1.85 |
| Approach Delay [s/veh]             | 4.22  |      | 15.78 |        | 3.82  |      |
| Approach LOS                       | A     |      | C     |        | A     |      |
| Intersection Delay [s/veh]         | 12.28 |      |       |        |       |      |
| Intersection LOS                   | B     |      |       |        |       |      |

### Intersection Level Of Service Report

#### Intersection 3: Mullan Rd & Chuck Wagon Dr

|                  |                 |                           |       |
|------------------|-----------------|---------------------------|-------|
| Control Type:    | Two-way stop    | Delay (sec / veh):        | 24.8  |
| Analysis Method: | HCM 7th Edition | Level Of Service:         | C     |
| Analysis Period: | 15 minutes      | Volume to Capacity (v/c): | 0.195 |

#### Intersection Setup

| Name                         | Chuck Wagon Drive   |        | Mullan Road  |        | Mullan Road   |        |
|------------------------------|---|--------|--|--------|---|--------|
| Approach                     | Southbound  |        | Eastbound  |        | Westbound   |        |
| Lane Configuration           |  |        |  |        |  |        |
| Turning Movement             | Left  | Right  | Left   | Thru   | Thru  | Right  |
| Lane Width [ft]              | 12.00   | 12.00  | 12.00  | 12.00  | 12.00   | 12.00  |
| No. of Lanes in Entry Pocket | 0   | 1      | 1  | 0      | 0   | 0      |
| Entry Pocket Length [ft]     | 100.00  | 100.00 | 100.00   | 100.00 | 100.00  | 100.00 |
| No. of Lanes in Exit Pocket  | 0   | 0      | 0  | 0      | 0   | 0      |
| Exit Pocket Length [ft]      | 0.00  | 0.00   | 0.00   | 0.00   | 0.00  | 0.00   |
| Speed [mph]                  | 30.00   |        | 45.00  |        | 45.00   |        |
| Grade [%]                    | 0.00  |        | 0.00   |        | 0.00  |        |
| Crosswalk                    | Yes   |        | No   |        | No  |        |

#### Volumes

| Name                                    | Chuck Wagon Drive |        | Mullan Road |        | Mullan Road |        |
|---|-------------------|--------|-------------|--------|-------------|--------|
| Base Volume Input [veh/h]               | 42                | 11     | 7           | 817    | 176         | 22     |
| Base Volume Adjustment Factor           | 1.0000            | 1.0000 | 1.0000      | 1.0000 | 1.0000      | 1.0000 |
| Heavy Vehicles Percentage [%]           | 0.00              | 0.00   | 0.00        | 1.70   | 5.70        | 0.00   |
| Growth Factor                           | 1.0000            | 1.0000 | 1.0000      | 1.0000 | 1.0000      | 1.0000 |
| In-Process Volume [veh/h]               | 0                 | 0      | 0           | 0      | 0           | 0      |
| Site-Generated Trips [veh/h]            | 0                 | 0      | 0           | 0      | 0           | 0      |
| Diverted Trips [veh/h]                  | 0                 | 0      | 0           | 0      | 0           | 0      |
| Pass-by Trips [veh/h]                   | 0                 | 0      | 0           | 0      | 0           | 0      |
| Existing Site Adjustment Volume [veh/h] | 0                 | 0      | 0           | 0      | 0           | 0      |
| Other Volume [veh/h]                    | 0                 | 0      | 0           | 0      | 0           | 0      |
| Total Hourly Volume [veh/h]             | 42                | 11     | 7           | 817    | 176         | 22     |
| Peak Hour Factor                        | 0.9500            | 0.9500 | 0.8800      | 0.8800 | 1.0000      | 1.0000 |
| Other Adjustment Factor                 | 1.0000            | 1.0000 | 1.0000      | 1.0000 | 1.0000      | 1.0000 |
| Total 15-Minute Volume [veh/h]          | 11                | 3      | 2           | 232    | 44          | 6      |
| Total Analysis Volume [veh/h]           | 44                | 12     | 8           | 928    | 176         | 22     |
| Pedestrian Volume [ped/h]               | 0                 |        | 0           |        | 0           |        |

**Intersection Settings**

| Priority Scheme                    | Stop | Free | Free |
|------------------------------------|------|------|------|
| Flared Lane                        |      |      |      |
| Storage Area [veh]                 | 0    | 0    | 0    |
| Two-Stage Gap Acceptance           | No   |      |      |
| Number of Storage Spaces in Median | 0    | 0    | 0    |

**Movement, Approach, & Intersection Results**

|                                       |       |      |      |      |      |      |
|---------------------------------------|-------|------|------|------|------|------|
| V/C, Movement V/C Ratio               | 0.19  | 0.01 | 0.01 | 0.01 | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh]       | 24.77 | 9.24 | 7.61 | 0.00 | 0.00 | 0.00 |
| Movement LOS                          | C     | A    | A    | A    | A    | A    |
| 95th-Percentile Queue Length [veh/ln] | 0.70  | 0.04 | 0.02 | 0.00 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [ft/ln]  | 17.61 | 1.06 | 0.44 | 0.00 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh]           | 21.44 |      | 0.07 |      | 0.00 |      |
| Approach LOS                          | C     |      | A    |      | A    |      |
| d_I, Intersection Delay [s/veh]       | 1.06  |      |      |      |      |      |
| Intersection LOS                      | C     |      |      |      |      |      |

### Intersection Level Of Service Report

#### Intersection 2: Mullan Rd & George Elmer Dr




Control Type:  
Analysis Method:  
Analysis Period:

Roundabout  
HCM 7th Edition  
15 minutes

Delay (sec / veh):  
Level Of Service:

7.0  
A

#### Intersection Setup

| Name                         | George Elmer Drive  |        | Mullan Road  |        | Mullan Road   |        |
|------------------------------|---|--------|--|--------|---|--------|
| Approach                     | Southbound  |        | Eastbound  |        | Westbound   |        |
| Lane Configuration           |  |        |  |        |  |        |
| Turning Movement             | Left  | Right  | Left   | Thru   | Thru  | Right  |
| Lane Width [ft]              | 12.00   | 12.00  | 12.00  | 12.00  | 12.00   | 12.00  |
| No. of Lanes in Entry Pocket | 0   | 1      | 1  | 0      | 0   | 1      |
| Entry Pocket Length [ft]     | 100.00  | 100.00 | 100.00   | 100.00 | 100.00  | 100.00 |
| No. of Lanes in Exit Pocket  | 0   | 0      | 0  | 0      | 0   | 0      |
| Exit Pocket Length [ft]      | 0.00  | 0.00   | 0.00   | 0.00   | 0.00  | 0.00   |
| Speed [mph]                  | 30.00   |        | 45.00  |        | 45.00   |        |
| Grade [%]                    | 0.00  |        | 0.00   |        | 0.00  |        |
| Crosswalk                    | No  |        | No   |        | No  |        |

#### Volumes

| Name                                    | George Elmer Drive |        | Mullan Road |        | Mullan Road |        |
|---|--------------------|--------|-------------|--------|-------------|--------|
| Base Volume Input [veh/h]               | 89                 | 62     | 21          | 348    | 728         | 123    |
| Base Volume Adjustment Factor           | 1.0000             | 1.0000 | 1.0000      | 1.0000 | 1.0000      | 1.0000 |
| Heavy Vehicles Percentage [%]           | 0.00               | 1.60   | 0.00        | 0.00   | 0.10        | 0.00   |
| Proportion of CAVs [%]                  | 0.00               |        |             |        |             |        |
| Growth Factor                           | 1.0000             | 1.0000 | 1.0000      | 1.0000 | 1.0000      | 1.0000 |
| In-Process Volume [veh/h]               | 0                  | 0      | 0           | 0      | 0           | 0      |
| Site-Generated Trips [veh/h]            | 0                  | 0      | 0           | 0      | 0           | 0      |
| Diverted Trips [veh/h]                  | 0                  | 0      | 0           | 0      | 0           | 0      |
| Pass-by Trips [veh/h]                   | 0                  | 0      | 0           | 0      | 0           | 0      |
| Existing Site Adjustment Volume [veh/h] | 0                  | 0      | 0           | 0      | 0           | 0      |
| Other Volume [veh/h]                    | 0                  | 0      | 0           | 0      | 0           | 0      |
| Total Hourly Volume [veh/h]             | 89                 | 62     | 21          | 348    | 728         | 123    |
| Peak Hour Factor                        | 0.9200             | 0.9200 | 0.8800      | 0.8800 | 0.9400      | 0.9400 |
| Other Adjustment Factor                 | 1.0000             | 1.0000 | 1.0000      | 1.0000 | 1.0000      | 1.0000 |
| Total 15-Minute Volume [veh/h]          | 24                 | 17     | 6           | 99     | 194         | 33     |
| Total Analysis Volume [veh/h]           | 97                 | 67     | 24          | 395    | 774         | 131    |
| Pedestrian Volume [ped/h]               | 0                  |        | 0           |        | 0           |        |

**Intersection Settings**

|   |     |    |     |     |     |     |
|---|-----|----|-----|-----|-----|-----|
| Number of Conflicting Circulating Lanes | 1   |    | 1   |     | 1   |     |
| Circulating Flow Rate [veh/h]           | 775 |    | 97  |     | 24  |     |
| Exiting Flow Rate [veh/h]               | 155 |    | 843 |     | 492 |     |
| Demand Flow Rate [veh/h]                | 89  | 62 | 21  | 348 | 728 | 123 |
| Adjusted Demand Flow Rate [veh/h]       | 97  | 67 | 24  | 395 | 774 | 131 |

**Lanes**

|  |         |         |         |         |         |         |
|--|---------|---------|---------|---------|---------|---------|
| Override Calculated Critical Headway       | No      | No      | No      | No      | No      | No      |
| User-Defined Critical Headway [s]          | 4.00    | 4.00    | 4.00    | 4.00    | 4.00    | 4.00    |
| Override Calculated Follow-Up Time         | No      | No      | No      | No      | No      | No      |
| User-Defined Follow-Up Time [s]            | 3.00    | 3.00    | 3.00    | 3.00    | 3.00    | 3.00    |
| A (intercept)                              | 1420.00 | 1420.00 | 1420.00 | 1420.00 | 1420.00 | 1420.00 |
| B (coefficient)                            | 0.00091 | 0.00091 | 0.00091 | 0.00091 | 0.00091 | 0.00091 |
| HV Adjustment Factor                       | 1.00    | 0.98    | 1.00    | 1.00    | 1.00    | 1.00    |
| Entry Flow Rate [veh/h]                    | 97      | 69      | 24      | 395     | 775     | 131     |
| Capacity of Entry and Bypass Lanes [veh/h] | 702     | 702     | 1301    | 1301    | 1390    | 1390    |
| Pedestrian Impedance                       | 1.00    | 1.00    | 1.00    | 1.00    | 1.00    | 1.00    |
| Capacity per Entry Lane [veh/h]            | 702     | 691     | 1301    | 1301    | 1388    | 1390    |
| X, volume / capacity                       | 0.14    | 0.10    | 0.02    | 0.30    | 0.56    | 0.09    |

**Movement, Approach, & Intersection Results**




|                                    |       |      |      |       |       |      |
|------------------------------------|-------|------|------|-------|-------|------|
| Lane LOS                           | A     | A    | A    | A     | A     | A    |
| 95th-Percentile Queue Length [veh] | 0.48  | 0.32 | 0.06 | 1.29  | 3.61  | 0.31 |
| 95th-Percentile Queue Length [ft]  | 11.96 | 8.03 | 1.41 | 32.36 | 90.30 | 7.79 |
| Approach Delay [s/veh]             | 6.49  |      | 5.34 |       | 7.84  |      |
| Approach LOS                       | A     |      | A    |       | A     |      |
| Intersection Delay [s/veh]         | 6.99  |      |      |       |       |      |
| Intersection LOS                   | A     |      |      |       |       |      |

### Intersection Level Of Service Report

#### Intersection 3: Mullan Rd & Chuck Wagon Dr

|                  |                 |                           |       |
|------------------|-----------------|---------------------------|-------|
| Control Type:    | Two-way stop    | Delay (sec / veh):        | 24.5  |
| Analysis Method: | HCM 7th Edition | Level Of Service:         | C     |
| Analysis Period: | 15 minutes      | Volume to Capacity (v/c): | 0.089 |

#### Intersection Setup

| Name                         | Chuck Wagon Drive   |        | Mullan Road  |        | Mullan Road   |        |
|------------------------------|---|--------|--|--------|---|--------|
| Approach                     | Southbound  |        | Eastbound  |        | Westbound   |        |
| Lane Configuration           |  |        |  |        |  |        |
| Turning Movement             | Left  | Right  | Left   | Thru   | Thru  | Right  |
| Lane Width [ft]              | 12.00   | 12.00  | 12.00  | 12.00  | 12.00   | 12.00  |
| No. of Lanes in Entry Pocket | 0   | 1      | 1  | 0      | 0   | 0      |
| Entry Pocket Length [ft]     | 100.00  | 100.00 | 100.00   | 100.00 | 100.00  | 100.00 |
| No. of Lanes in Exit Pocket  | 0   | 0      | 0  | 0      | 0   | 0      |
| Exit Pocket Length [ft]      | 0.00  | 0.00   | 0.00   | 0.00   | 0.00  | 0.00   |
| Speed [mph]                  | 30.00   |        | 45.00  |        | 45.00   |        |
| Grade [%]                    | 0.00  |        | 0.00   |        | 0.00  |        |
| Crosswalk                    | Yes   |        | No   |        | No  |        |

#### Volumes

| Name                                    | Chuck Wagon Drive |        | Mullan Road |        | Mullan Road |        |
|---|-------------------|--------|-------------|--------|-------------|--------|
| Base Volume Input [veh/h]               | 18                | 11     | 10          | 347    | 726         | 54     |
| Base Volume Adjustment Factor           | 1.0000            | 1.0000 | 1.0000      | 1.0000 | 1.0000      | 1.0000 |
| Heavy Vehicles Percentage [%]           | 0.00              | 5.00   | 0.00        | 0.00   | 0.30        | 0.00   |
| Growth Factor                           | 1.0000            | 1.0000 | 1.0000      | 1.0000 | 1.0000      | 1.0000 |
| In-Process Volume [veh/h]               | 0                 | 0      | 0           | 0      | 0           | 0      |
| Site-Generated Trips [veh/h]            | 0                 | 0      | 0           | 0      | 0           | 0      |
| Diverted Trips [veh/h]                  | 0                 | 0      | 0           | 0      | 0           | 0      |
| Pass-by Trips [veh/h]                   | 0                 | 0      | 0           | 0      | 0           | 0      |
| Existing Site Adjustment Volume [veh/h] | 0                 | 0      | 0           | 0      | 0           | 0      |
| Other Volume [veh/h]                    | 0                 | 0      | 0           | 0      | 0           | 0      |
| Total Hourly Volume [veh/h]             | 18                | 11     | 10          | 347    | 726         | 54     |
| Peak Hour Factor                        | 1.0000            | 1.0000 | 0.8600      | 0.8600 | 0.9700      | 0.9700 |
| Other Adjustment Factor                 | 1.0000            | 1.0000 | 1.0000      | 1.0000 | 1.0000      | 1.0000 |
| Total 15-Minute Volume [veh/h]          | 5                 | 3      | 3           | 101    | 187         | 14     |
| Total Analysis Volume [veh/h]           | 18                | 11     | 12          | 403    | 748         | 56     |
| Pedestrian Volume [ped/h]               | 0                 |        | 0           |        | 0           |        |



**Intersection Settings**

| Priority Scheme                    | Stop | Free | Free |
|------------------------------------|------|------|------|
| Flared Lane                        |      |      |      |
| Storage Area [veh]                 | 0    | 0    | 0    |
| Two-Stage Gap Acceptance           | No   |      |      |
| Number of Storage Spaces in Median | 0    | 0    | 0    |

**Movement, Approach, & Intersection Results**

|                                       |       |       |      |      |      |      |
|---------------------------------------|-------|-------|------|------|------|------|
| V/C, Movement V/C Ratio               | 0.09  | 0.03  | 0.01 | 0.00 | 0.01 | 0.00 |
| d_M, Delay for Movement [s/veh]       | 24.50 | 14.43 | 9.41 | 0.00 | 0.00 | 0.00 |
| Movement LOS                          | C     | B     | A    | A    | A    | A    |
| 95th-Percentile Queue Length [veh/ln] | 0.29  | 0.09  | 0.04 | 0.00 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [ft/ln]  | 7.22  | 2.16  | 1.10 | 0.00 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh]           | 20.68 |       | 0.27 |      | 0.00 |      |
| Approach LOS                          | C     |       | A    |      | A    |      |
| d_I, Intersection Delay [s/veh]       | 0.57  |       |      |      |      |      |
| Intersection LOS                      | C     |       |      |      |      |      |

**CAPACITY CALCULATIONS –  
FUTURE (2030)**

ATTACHMENT D

Intelligent Infrastructure.  
Enduring Communities.






| Intersection                | Approach     | Future (2030)             |     |                    |                   |     |                    |
|-----------------------------|--------------|---------------------------|-----|--------------------|-------------------|-----|--------------------|
|                             |              | AM Peak                   |     |                    | PM Peak           |     |                    |
|                             |              | Avg Delay (s/veh)         | LOS | 95th % Queue (veh) | Avg Delay (s/veh) | LOS | 95th % Queue (veh) |
| Intersection Control        |              | One-Way Stop-Control (NB) |     |                    |                   |     |                    |
| England Blvd & George Elmer | NB           | 15.3                      | C   | 4                  | 33.4              | D   | 4                  |
|                             | EB           | 0.0                       | A   | 0                  | 0.0               | A   | 0                  |
|                             | WB           | 4.4                       | A   | 1                  | 5.2               | A   | 2                  |
|                             | Intersection | 7.7                       | A   | --                 | 8.7               | A   | --                 |
| Intersection Control        |              | Roundabout                |     |                    |                   |     |                    |
| Mullan Rd & George Elmer Dr | SB           | 5.3                       | A   | 1                  | 9.1               | A   | 2                  |
|                             | EB           | 38.4                      | E   | 19                 | 6.4               | A   | 2                  |
|                             | WB           | 4.1                       | A   | 1                  | 9.9               | A   | 6                  |
|                             | Intersection | 26.4                      | D   | --                 | 8.9               | A   | --                 |
| Intersection Control        |              | One-Way Stop-Control (SB) |     |                    |                   |     |                    |
| Mullan Rd & Chuck Wagon Dr  | SB           | 35.0                      | D   | 4                  | 42.2              | E   | 3                  |
|                             | EB           | 0.2                       | A   | 1                  | 1.5               | A   | 1                  |
|                             | WB           | 0.0                       | A   | 0                  | 0.0               | A   | 0                  |
|                             | Intersection | 4.4                       | A   | --                 | 3.3               | A   | --                 |

**Intersection Level Of Service Report**  
**Intersection 1: England Blvd & George Elmer Dr**

|                  |                 |                           |       |
|------------------|-----------------|---------------------------|-------|
| Control Type:    | Two-way stop    | Delay (sec / veh):        | 18.4  |
| Analysis Method: | HCM 7th Edition | Level Of Service:         | C     |
| Analysis Period: | 15 minutes      | Volume to Capacity (v/c): | 0.005 |

**Intersection Setup**

| Name                         | George Elmer Drive  |        | England Boulevard  |        | England Boulevard   |        |
|------------------------------|---|--------|--|--------|---|--------|
| Approach                     | Northbound  |        | Eastbound  |        | Westbound   |        |
| Lane Configuration           |  |        |  |        |  |        |
| Turning Movement             | Left  | Right  | Thru   | Right  | Left  | Thru   |
| Lane Width [ft]              | 12.00   | 12.00  | 12.00  | 12.00  | 12.00   | 12.00  |
| No. of Lanes in Entry Pocket | 0   | 0      | 0  | 0      | 0   | 0      |
| Entry Pocket Length [ft]     | 100.00  | 100.00 | 100.00   | 100.00 | 100.00  | 100.00 |
| No. of Lanes in Exit Pocket  | 0   | 0      | 0  | 0      | 0   | 0      |
| Exit Pocket Length [ft]      | 0.00  | 0.00   | 0.00   | 0.00   | 0.00  | 0.00   |
| Speed [mph]                  | 30.00   |        | 30.00  |        | 30.00   |        |
| Grade [%]                    | 0.00  |        | 0.00   |        | 0.00  |        |
| Crosswalk                    | No  |        | No   |        | No  |        |

**Volumes**

| Name                                    | George Elmer Drive |        | England Boulevard |        | England Boulevard |        |
|---|--------------------|--------|-------------------|--------|-------------------|--------|
| Base Volume Input [veh/h]               | 2                  | 351    | 249               | 30     | 101               | 81     |
| Base Volume Adjustment Factor           | 1.0000             | 1.0000 | 1.0000            | 1.0000 | 1.0000            | 1.0000 |
| Heavy Vehicles Percentage [%]           | 2.00               | 2.00   | 2.00              | 2.00   | 2.00              | 2.00   |
| Growth Factor                           | 1.0000             | 1.0000 | 1.0000            | 1.0000 | 1.0000            | 1.0000 |
| In-Process Volume [veh/h]               | 0                  | 0      | 0                 | 0      | 0                 | 0      |
| Site-Generated Trips [veh/h]            | 0                  | 0      | 0                 | 0      | 0                 | 0      |
| Diverted Trips [veh/h]                  | 0                  | 0      | 0                 | 0      | 0                 | 0      |
| Pass-by Trips [veh/h]                   | 0                  | 0      | 0                 | 0      | 0                 | 0      |
| Existing Site Adjustment Volume [veh/h] | 0                  | 0      | 0                 | 0      | 0                 | 0      |
| Other Volume [veh/h]                    | 0                  | 0      | 0                 | 0      | 0                 | 0      |
| Total Hourly Volume [veh/h]             | 2                  | 351    | 249               | 30     | 101               | 81     |
| Peak Hour Factor                        | 0.9200             | 0.9200 | 0.9200            | 0.9200 | 0.9200            | 0.9200 |
| Other Adjustment Factor                 | 1.0000             | 1.0000 | 1.0000            | 1.0000 | 1.0000            | 1.0000 |
| Total 15-Minute Volume [veh/h]          | 1                  | 95     | 68                | 8      | 27                | 22     |
| Total Analysis Volume [veh/h]           | 2                  | 382    | 271               | 33     | 110               | 88     |
| Pedestrian Volume [ped/h]               | 0                  |        | 0                 |        | 0                 |        |

**Intersection Settings**

|                                    |      |      |      |
|------------------------------------|------|------|------|
| Priority Scheme                    | Stop | Free | Free |
| Flared Lane                        | No   |      |      |
| Storage Area [veh]                 | 0    | 0    | 0    |
| Two-Stage Gap Acceptance           | No   |      |      |
| Number of Storage Spaces in Median | 0    | 0    | 0    |

**Movement, Approach, & Intersection Results**

|                                       |       |       |      |      |      |      |
|---------------------------------------|-------|-------|------|------|------|------|
| V/C, Movement V/C Ratio               | 0.00  | 0.51  | 0.00 | 0.00 | 0.09 | 0.00 |
| d_M, Delay for Movement [s/veh]       | 18.45 | 14.74 | 0.00 | 0.00 | 7.99 | 0.00 |
| Movement LOS                          | C     | B     | A    | A    | A    | A    |
| 95th-Percentile Queue Length [veh/ln] | 2.97  | 2.97  | 0.00 | 0.00 | 0.20 | 0.20 |
| 95th-Percentile Queue Length [ft/ln]  | 74.17 | 74.17 | 0.00 | 0.00 | 4.88 | 4.88 |
| d_A, Approach Delay [s/veh]           | 14.76 |       | 0.00 |      | 4.44 |      |
| Approach LOS                          | B     |       | A    |      | A    |      |
| d_I, Intersection Delay [s/veh]       | 7.39  |       |      |      |      |      |
| Intersection LOS                      | C     |       |      |      |      |      |

### Intersection Level Of Service Report

#### Intersection 2: Mullan Rd & George Elmer Dr

Control Type:  
Analysis Method:  
Analysis Period:

Roundabout  
HCM 7th Edition  
15 minutes

Delay (sec / veh):  
Level Of Service:

26.4  
D

#### Intersection Setup

| Name                         | George Elmer Drive |        | Mullan Road |        | Mullan Road |        |
|------------------------------|--------------------|--------|-------------|--------|-------------|--------|
| Approach                     | Southbound         |        | Eastbound   |        | Westbound   |        |
| Lane Configuration           | ↵↵                 |        | ↵↑          |        | ↑↵          |        |
| Turning Movement             | Left               | Right  | Left        | Thru   | Thru        | Right  |
| Lane Width [ft]              | 12.00              | 12.00  | 12.00       | 12.00  | 12.00       | 12.00  |
| No. of Lanes in Entry Pocket | 0                  | 1      | 1           | 0      | 0           | 1      |
| Entry Pocket Length [ft]     | 100.00             | 100.00 | 100.00      | 100.00 | 100.00      | 100.00 |
| No. of Lanes in Exit Pocket  | 0                  | 0      | 0           | 0      | 0           | 0      |
| Exit Pocket Length [ft]      | 0.00               | 0.00   | 0.00        | 0.00   | 0.00        | 0.00   |
| Speed [mph]                  | 30.00              |        | 45.00       |        | 45.00       |        |
| Grade [%]                    | 0.00               |        | 0.00        |        | 0.00        |        |
| Crosswalk                    | No                 |        | No          |        | No          |        |

#### Volumes

| Name                                    | George Elmer Drive |        | Mullan Road |        | Mullan Road |        |
|---|--------------------|--------|-------------|--------|-------------|--------|
| Base Volume Input [veh/h]               | 243                | 16     | 37          | 981    | 237         | 67     |
| Base Volume Adjustment Factor           | 1.0000             | 1.0000 | 1.0000      | 1.0000 | 1.0000      | 1.0000 |
| Heavy Vehicles Percentage [%]           | 0.00               | 5.00   | 2.90        | 1.60   | 4.60        | 0.00   |
| Proportion of CAVs [%]                  | 0.00               |        |             |        |             |        |
| Growth Factor                           | 1.0000             | 1.0000 | 1.0000      | 1.0000 | 1.0000      | 1.0000 |
| In-Process Volume [veh/h]               | 0                  | 0      | 0           | 0      | 0           | 0      |
| Site-Generated Trips [veh/h]            | 0                  | 0      | 0           | 0      | 0           | 0      |
| Diverted Trips [veh/h]                  | 0                  | 0      | 0           | 0      | 0           | 0      |
| Pass-by Trips [veh/h]                   | 0                  | 0      | 0           | 0      | 0           | 0      |
| Existing Site Adjustment Volume [veh/h] | 0                  | 0      | 0           | 0      | 0           | 0      |
| Other Volume [veh/h]                    | 0                  | 0      | 0           | 0      | 0           | 0      |
| Total Hourly Volume [veh/h]             | 243                | 16     | 37          | 981    | 237         | 67     |
| Peak Hour Factor                        | 0.9200             | 0.9200 | 0.9200      | 0.9200 | 0.9200      | 0.9200 |
| Other Adjustment Factor                 | 1.0000             | 1.0000 | 1.0000      | 1.0000 | 1.0000      | 1.0000 |
| Total 15-Minute Volume [veh/h]          | 66                 | 4      | 10          | 267    | 64          | 18     |
| Total Analysis Volume [veh/h]           | 264                | 17     | 40          | 1066   | 258         | 73     |
| Pedestrian Volume [ped/h]               | 0                  |        | 0           |        | 0           |        |

**Intersection Settings**

|   |     |    |     |      |      |    |
|---|-----|----|-----|------|------|----|
| Number of Conflicting Circulating Lanes | 1   |    | 1   |      | 1    |    |
| Circulating Flow Rate [veh/h]           | 270 |    | 264 |      | 41   |    |
| Exiting Flow Rate [veh/h]               | 114 |    | 288 |      | 1347 |    |
| Demand Flow Rate [veh/h]                | 243 | 16 | 37  | 981  | 237  | 67 |
| Adjusted Demand Flow Rate [veh/h]       | 264 | 17 | 40  | 1066 | 258  | 73 |

**Lanes**

|  |         |         |         |         |         |         |
|--|---------|---------|---------|---------|---------|---------|
| Override Calculated Critical Headway       | No      | No      | No      | No      | No      | No      |
| User-Defined Critical Headway [s]          | 4.00    | 4.00    | 4.00    | 4.00    | 4.00    | 4.00    |
| Override Calculated Follow-Up Time         | No      | No      | No      | No      | No      | No      |
| User-Defined Follow-Up Time [s]            | 3.00    | 3.00    | 3.00    | 3.00    | 3.00    | 3.00    |
| A (intercept)                              | 1420.00 | 1420.00 | 1420.00 | 1420.00 | 1420.00 | 1420.00 |
| B (coefficient)                            | 0.00091 | 0.00091 | 0.00091 | 0.00091 | 0.00091 | 0.00091 |
| HV Adjustment Factor                       | 1.00    | 0.95    | 0.97    | 0.98    | 0.96    | 1.00    |
| Entry Flow Rate [veh/h]                    | 264     | 18      | 42      | 1084    | 270     | 73      |
| Capacity of Entry and Bypass Lanes [veh/h] | 1111    | 1111    | 1117    | 1117    | 1368    | 1368    |
| Pedestrian Impedance                       | 1.00    | 1.00    | 1.00    | 1.00    | 1.00    | 1.00    |
| Capacity per Entry Lane [veh/h]            | 1111    | 1058    | 1086    | 1100    | 1308    | 1368    |
| X, volume / capacity                       | 0.24    | 0.02    | 0.04    | 0.97    | 0.20    | 0.05    |

**Movement, Approach, & Intersection Results**




|                                    |       |      |       |        |       |      |
|------------------------------------|-------|------|-------|--------|-------|------|
| Lane LOS                           | A     | A    | A     | E      | A     | A    |
| 95th-Percentile Queue Length [veh] | 0.93  | 0.05 | 0.11  | 18.03  | 0.73  | 0.17 |
| 95th-Percentile Queue Length [ft]  | 23.18 | 1.22 | 2.87  | 450.71 | 18.33 | 4.22 |
| Approach Delay [s/veh]             | 5.32  |      | 38.44 |        | 4.11  |      |
| Approach LOS                       | A     |      | E     |        | A     |      |
| Intersection Delay [s/veh]         | 26.41 |      |       |        |       |      |
| Intersection LOS                   | D     |      |       |        |       |      |

### Intersection Level Of Service Report

#### Intersection 3: Mullan Rd & Chuck Wagon Dr

|                  |                 |                           |       |
|------------------|-----------------|---------------------------|-------|
| Control Type:    | Two-way stop    | Delay (sec / veh):        | 50.2  |
| Analysis Method: | HCM 7th Edition | Level Of Service:         | F     |
| Analysis Period: | 15 minutes      | Volume to Capacity (v/c): | 0.596 |

#### Intersection Setup

| Name                         | Chuck Wagon Drive   |        | Mullan Road  |        | Mullan Road   |        |
|------------------------------|---|--------|--|--------|---|--------|
| Approach                     | Southbound  |        | Eastbound  |        | Westbound   |        |
| Lane Configuration           |  |        |  |        |  |        |
| Turning Movement             | Left  | Right  | Left   | Thru   | Thru  | Right  |
| Lane Width [ft]              | 12.00   | 12.00  | 12.00  | 12.00  | 12.00   | 12.00  |
| No. of Lanes in Entry Pocket | 0   | 1      | 1  | 0      | 0   | 0      |
| Entry Pocket Length [ft]     | 100.00  | 100.00 | 100.00   | 100.00 | 100.00  | 100.00 |
| No. of Lanes in Exit Pocket  | 0   | 0      | 0  | 0      | 0   | 0      |
| Exit Pocket Length [ft]      | 0.00  | 0.00   | 0.00   | 0.00   | 0.00  | 0.00   |
| Speed [mph]                  | 30.00   |        | 45.00  |        | 45.00   |        |
| Grade [%]                    | 0.00  |        | 0.00   |        | 0.00  |        |
| Crosswalk                    | Yes   |        | No   |        | No  |        |

#### Volumes

| Name                                    | Chuck Wagon Drive |        | Mullan Road |        | Mullan Road |        |
|---|-------------------|--------|-------------|--------|-------------|--------|
| Base Volume Input [veh/h]               | 100               | 61     | 23          | 904    | 201         | 41     |
| Base Volume Adjustment Factor           | 1.0000            | 1.0000 | 1.0000      | 1.0000 | 1.0000      | 1.0000 |
| Heavy Vehicles Percentage [%]           | 0.00              | 0.00   | 0.00        | 1.70   | 5.70        | 0.00   |
| Growth Factor                           | 1.0000            | 1.0000 | 1.0000      | 1.0000 | 1.0000      | 1.0000 |
| In-Process Volume [veh/h]               | 0                 | 0      | 0           | 0      | 0           | 0      |
| Site-Generated Trips [veh/h]            | 0                 | 0      | 0           | 0      | 0           | 0      |
| Diverted Trips [veh/h]                  | 0                 | 0      | 0           | 0      | 0           | 0      |
| Pass-by Trips [veh/h]                   | 0                 | 0      | 0           | 0      | 0           | 0      |
| Existing Site Adjustment Volume [veh/h] | 0                 | 0      | 0           | 0      | 0           | 0      |
| Other Volume [veh/h]                    | 0                 | 0      | 0           | 0      | 0           | 0      |
| Total Hourly Volume [veh/h]             | 100               | 61     | 23          | 904    | 201         | 41     |
| Peak Hour Factor                        | 0.9200            | 0.9200 | 0.9200      | 0.9200 | 0.9200      | 0.9200 |
| Other Adjustment Factor                 | 1.0000            | 1.0000 | 1.0000      | 1.0000 | 1.0000      | 1.0000 |
| Total 15-Minute Volume [veh/h]          | 27                | 17     | 6           | 246    | 55          | 11     |
| Total Analysis Volume [veh/h]           | 109               | 66     | 25          | 983    | 218         | 45     |
| Pedestrian Volume [ped/h]               | 0                 |        | 0           |        | 0           |        |



**Intersection Settings**

| Priority Scheme                    | Stop | Free | Free |
|------------------------------------|------|------|------|
| Flared Lane                        |      |      |      |
| Storage Area [veh]                 | 0    | 0    | 0    |
| Two-Stage Gap Acceptance           | No   |      |      |
| Number of Storage Spaces in Median | 0    | 0    | 0    |

**Movement, Approach, & Intersection Results**




|                                       |       |      |      |      |      |      |
|---------------------------------------|-------|------|------|------|------|------|
| V/C, Movement V/C Ratio               | 0.60  | 0.08 | 0.02 | 0.01 | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh]       | 50.19 | 9.88 | 7.80 | 0.00 | 0.00 | 0.00 |
| Movement LOS                          | F     | A    | A    | A    | A    | A    |
| 95th-Percentile Queue Length [veh/ln] | 3.27  | 0.27 | 0.06 | 0.00 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [ft/ln]  | 81.76 | 6.69 | 1.46 | 0.00 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh]           | 34.99 |      | 0.19 |      | 0.00 |      |
| Approach LOS                          | D     |      | A    |      | A    |      |
| d_I, Intersection Delay [s/veh]       | 4.37  |      |      |      |      |      |
| Intersection LOS                      | F     |      |      |      |      |      |

### Intersection Level Of Service Report

#### Intersection 1: England Blvd & George Elmer Dr

|                  |                 |                           |       |
|------------------|-----------------|---------------------------|-------|
| Control Type:    | Two-way stop    | Delay (sec / veh):        | 65.7  |
| Analysis Method: | HCM 7th Edition | Level Of Service:         | F     |
| Analysis Period: | 15 minutes      | Volume to Capacity (v/c): | 0.430 |

#### Intersection Setup

| Name                         | George Elmer Drive  |        | England Boulevard   |        | England Boulevard   |        |
|------------------------------|---|--------|---|--------|---|--------|
| Approach                     | Northbound  |        | Eastbound   |        | Westbound   |        |
| Lane Configuration           |  |        |  |        |  |        |
| Turning Movement             | Left  | Right  | Thru  | Right  | Left  | Thru   |
| Lane Width [ft]              | 12.00   | 12.00  | 12.00   | 12.00  | 12.00   | 12.00  |
| No. of Lanes in Entry Pocket | 0   | 0      | 0   | 0      | 0   | 0      |
| Entry Pocket Length [ft]     | 100.00  | 100.00 | 100.00  | 100.00 | 100.00  | 100.00 |
| No. of Lanes in Exit Pocket  | 0   | 0      | 0   | 0      | 0   | 0      |
| Exit Pocket Length [ft]      | 0.00  | 0.00   | 0.00  | 0.00   | 0.00  | 0.00   |
| Speed [mph]                  | 30.00   |        | 30.00   |        | 30.00   |        |
| Grade [%]                    | 0.00  |        | 0.00  |        | 0.00  |        |
| Crosswalk                    | No  |        | No  |        | No  |        |

#### Volumes

| Name                                    | George Elmer Drive |        | England Boulevard |        | England Boulevard |        |
|---|--------------------|--------|-------------------|--------|-------------------|--------|
| Base Volume Input [veh/h]               | 32                 | 133    | 160               | 19     | 453               | 270    |
| Base Volume Adjustment Factor           | 1.0000             | 1.0000 | 1.0000            | 1.0000 | 1.0000            | 1.0000 |
| Heavy Vehicles Percentage [%]           | 2.00               | 2.00   | 2.00              | 2.00   | 2.00              | 2.00   |
| Growth Factor                           | 1.0000             | 1.0000 | 1.0000            | 1.0000 | 1.0000            | 1.0000 |
| In-Process Volume [veh/h]               | 0                  | 0      | 0                 | 0      | 0                 | 0      |
| Site-Generated Trips [veh/h]            | 0                  | 0      | 0                 | 0      | 0                 | 0      |
| Diverted Trips [veh/h]                  | 0                  | 0      | 0                 | 0      | 0                 | 0      |
| Pass-by Trips [veh/h]                   | 0                  | 0      | 0                 | 0      | 0                 | 0      |
| Existing Site Adjustment Volume [veh/h] | 0                  | 0      | 0                 | 0      | 0                 | 0      |
| Other Volume [veh/h]                    | 0                  | 0      | 0                 | 0      | 0                 | 0      |
| Total Hourly Volume [veh/h]             | 32                 | 133    | 160               | 19     | 453               | 270    |
| Peak Hour Factor                        | 0.9200             | 0.9200 | 0.9200            | 0.9200 | 0.9200            | 0.9200 |
| Other Adjustment Factor                 | 1.0000             | 1.0000 | 1.0000            | 1.0000 | 1.0000            | 1.0000 |
| Total 15-Minute Volume [veh/h]          | 9                  | 36     | 43                | 5      | 123               | 73     |
| Total Analysis Volume [veh/h]           | 35                 | 145    | 174               | 21     | 492               | 293    |
| Pedestrian Volume [ped/h]               | 0                  |        | 0                 |        | 0                 |        |

**Intersection Settings**

|                                    |      |      |      |
|------------------------------------|------|------|------|
| Priority Scheme                    | Stop | Free | Free |
| Flared Lane                        | No   |      |      |
| Storage Area [veh]                 | 0    | 0    | 0    |
| Two-Stage Gap Acceptance           | No   |      |      |
| Number of Storage Spaces in Median | 0    | 0    | 0    |

**Movement, Approach, & Intersection Results**

|                                       |       |       |      |      |       |       |
|---------------------------------------|-------|-------|------|------|-------|-------|
| V/C, Movement V/C Ratio               | 0.43  | 0.17  | 0.00 | 0.00 | 0.36  | 0.00  |
| d_M, Delay for Movement [s/veh]       | 65.66 | 25.61 | 0.00 | 0.00 | 8.36  | 0.00  |
| Movement LOS                          | F     | D     | A    | A    | A     | A     |
| 95th-Percentile Queue Length [veh/ln] | 3.62  | 3.62  | 0.00 | 0.00 | 1.12  | 1.12  |
| 95th-Percentile Queue Length [ft/ln]  | 90.39 | 90.39 | 0.00 | 0.00 | 28.02 | 28.02 |
| d_A, Approach Delay [s/veh]           | 33.40 |       | 0.00 |      | 5.24  |       |
| Approach LOS                          | D     |       | A    |      | A     |       |
| d_I, Intersection Delay [s/veh]       | 8.73  |       |      |      |       |       |
| Intersection LOS                      | F     |       |      |      |       |       |

### Intersection Level Of Service Report

#### Intersection 2: Mullan Rd & George Elmer Dr




Control Type:  
Analysis Method:  
Analysis Period:

Roundabout  
HCM 7th Edition  
15 minutes

Delay (sec / veh):  
Level Of Service:

8.9  
A

#### Intersection Setup

| Name                         | George Elmer Drive  |        | Mullan Road  |        | Mullan Road   |        |
|------------------------------|---|--------|--|--------|---|--------|
| Approach                     | Southbound  |        | Eastbound  |        | Westbound   |        |
| Lane Configuration           |  |        |  |        |  |        |
| Turning Movement             | Left  | Right  | Left   | Thru   | Thru  | Right  |
| Lane Width [ft]              | 12.00   | 12.00  | 12.00  | 12.00  | 12.00   | 12.00  |
| No. of Lanes in Entry Pocket | 0   | 1      | 1  | 0      | 0   | 1      |
| Entry Pocket Length [ft]     | 100.00  | 100.00 | 100.00   | 100.00 | 100.00  | 100.00 |
| No. of Lanes in Exit Pocket  | 0   | 0      | 0  | 0      | 0   | 0      |
| Exit Pocket Length [ft]      | 0.00  | 0.00   | 0.00   | 0.00   | 0.00  | 0.00   |
| Speed [mph]                  | 30.00   |        | 45.00  |        | 45.00   |        |
| Grade [%]                    | 0.00  |        | 0.00   |        | 0.00  |        |
| Crosswalk                    | No  |        | No   |        | No  |        |

#### Volumes

| Name                                    | George Elmer Drive |        | Mullan Road |        | Mullan Road |        |
|---|--------------------|--------|-------------|--------|-------------|--------|
| Base Volume Input [veh/h]               | 158                | 67     | 29          | 421    | 867         | 241    |
| Base Volume Adjustment Factor           | 1.0000             | 1.0000 | 1.0000      | 1.0000 | 1.0000      | 1.0000 |
| Heavy Vehicles Percentage [%]           | 0.00               | 1.60   | 0.00        | 0.00   | 0.10        | 0.00   |
| Proportion of CAVs [%]                  | 0.00               |        |             |        |             |        |
| Growth Factor                           | 1.0000             | 1.0000 | 1.0000      | 1.0000 | 1.0000      | 1.0000 |
| In-Process Volume [veh/h]               | 0                  | 0      | 0           | 0      | 0           | 0      |
| Site-Generated Trips [veh/h]            | 0                  | 0      | 0           | 0      | 0           | 0      |
| Diverted Trips [veh/h]                  | 0                  | 0      | 0           | 0      | 0           | 0      |
| Pass-by Trips [veh/h]                   | 0                  | 0      | 0           | 0      | 0           | 0      |
| Existing Site Adjustment Volume [veh/h] | 0                  | 0      | 0           | 0      | 0           | 0      |
| Other Volume [veh/h]                    | 0                  | 0      | 0           | 0      | 0           | 0      |
| Total Hourly Volume [veh/h]             | 158                | 67     | 29          | 421    | 867         | 241    |
| Peak Hour Factor                        | 0.9200             | 0.9200 | 0.9200      | 0.9200 | 0.9200      | 0.9200 |
| Other Adjustment Factor                 | 1.0000             | 1.0000 | 1.0000      | 1.0000 | 1.0000      | 1.0000 |
| Total 15-Minute Volume [veh/h]          | 43                 | 18     | 8           | 114    | 236         | 65     |
| Total Analysis Volume [veh/h]           | 172                | 73     | 32          | 458    | 942         | 262    |
| Pedestrian Volume [ped/h]               | 0                  |        | 0           |        | 0           |        |

**Intersection Settings**

|   |     |    |      |     |     |     |
|---|-----|----|------|-----|-----|-----|
| Number of Conflicting Circulating Lanes | 1   |    | 1    |     | 1   |     |
| Circulating Flow Rate [veh/h]           | 943 |    | 172  |     | 32  |     |
| Exiting Flow Rate [veh/h]               | 294 |    | 1017 |     | 630 |     |
| Demand Flow Rate [veh/h]                | 158 | 67 | 29   | 421 | 867 | 241 |
| Adjusted Demand Flow Rate [veh/h]       | 172 | 73 | 32   | 458 | 942 | 262 |

**Lanes**

|  |         |         |         |         |         |         |
|--|---------|---------|---------|---------|---------|---------|
| Override Calculated Critical Headway       | No      | No      | No      | No      | No      | No      |
| User-Defined Critical Headway [s]          | 4.00    | 4.00    | 4.00    | 4.00    | 4.00    | 4.00    |
| Override Calculated Follow-Up Time         | No      | No      | No      | No      | No      | No      |
| User-Defined Follow-Up Time [s]            | 3.00    | 3.00    | 3.00    | 3.00    | 3.00    | 3.00    |
| A (intercept)                              | 1420.00 | 1420.00 | 1420.00 | 1420.00 | 1420.00 | 1420.00 |
| B (coefficient)                            | 0.00091 | 0.00091 | 0.00091 | 0.00091 | 0.00091 | 0.00091 |
| HV Adjustment Factor                       | 1.00    | 0.98    | 1.00    | 1.00    | 1.00    | 1.00    |
| Entry Flow Rate [veh/h]                    | 172     | 75      | 32      | 458     | 943     | 262     |
| Capacity of Entry and Bypass Lanes [veh/h] | 603     | 603     | 1215    | 1215    | 1380    | 1380    |
| Pedestrian Impedance                       | 1.00    | 1.00    | 1.00    | 1.00    | 1.00    | 1.00    |
| Capacity per Entry Lane [veh/h]            | 603     | 593     | 1215    | 1215    | 1378    | 1380    |
| X, volume / capacity                       | 0.29    | 0.12    | 0.03    | 0.38    | 0.68    | 0.19    |

**Movement, Approach, & Intersection Results**




|                                    |       |       |      |       |        |       |
|------------------------------------|-------|-------|------|-------|--------|-------|
| Lane LOS                           | A     | A     | A    | A     | B      | A     |
| 95th-Percentile Queue Length [veh] | 1.17  | 0.42  | 0.08 | 1.78  | 5.85   | 0.70  |
| 95th-Percentile Queue Length [ft]  | 29.36 | 10.47 | 2.03 | 44.58 | 146.36 | 17.50 |
| Approach Delay [s/veh]             | 9.11  |       | 6.41 |       | 9.88   |       |
| Approach LOS                       | A     |       | A    |       | A      |       |
| Intersection Delay [s/veh]         | 8.91  |       |      |       |        |       |
| Intersection LOS                   | A     |       |      |       |        |       |

### Intersection Level Of Service Report

#### Intersection 3: Mullan Rd & Chuck Wagon Dr

|                  |                 |                           |       |
|------------------|-----------------|---------------------------|-------|
| Control Type:    | Two-way stop    | Delay (sec / veh):        | 60.8  |
| Analysis Method: | HCM 7th Edition | Level Of Service:         | F     |
| Analysis Period: | 15 minutes      | Volume to Capacity (v/c): | 0.495 |

#### Intersection Setup

| Name                         | Chuck Wagon Drive   |        | Mullan Road  |        | Mullan Road   |        |
|------------------------------|---|--------|--|--------|---|--------|
| Approach                     | Southbound  |        | Eastbound  |        | Westbound   |        |
| Lane Configuration           |  |        |  |        |  |        |
| Turning Movement             | Left  | Right  | Left   | Thru   | Thru  | Right  |
| Lane Width [ft]              | 12.00   | 12.00  | 12.00  | 12.00  | 12.00   | 12.00  |
| No. of Lanes in Entry Pocket | 0   | 1      | 1  | 0      | 0   | 0      |
| Entry Pocket Length [ft]     | 100.00  | 100.00 | 100.00   | 100.00 | 100.00  | 100.00 |
| No. of Lanes in Exit Pocket  | 0   | 0      | 0  | 0      | 0   | 0      |
| Exit Pocket Length [ft]      | 0.00  | 0.00   | 0.00   | 0.00   | 0.00  | 0.00   |
| Speed [mph]                  | 30.00   |        | 45.00  |        | 45.00   |        |
| Grade [%]                    | 0.00  |        | 0.00   |        | 0.00  |        |
| Crosswalk                    | Yes   |        | No   |        | No  |        |

#### Volumes

| Name                                    | Chuck Wagon Drive |        | Mullan Road |        | Mullan Road |        |
|---|-------------------|--------|-------------|--------|-------------|--------|
| Base Volume Input [veh/h]               | 55                | 43     | 64          | 391    | 807         | 117    |
| Base Volume Adjustment Factor           | 1.0000            | 1.0000 | 1.0000      | 1.0000 | 1.0000      | 1.0000 |
| Heavy Vehicles Percentage [%]           | 0.00              | 5.00   | 0.00        | 0.00   | 0.30        | 0.00   |
| Growth Factor                           | 1.0000            | 1.0000 | 1.0000      | 1.0000 | 1.0000      | 1.0000 |
| In-Process Volume [veh/h]               | 0                 | 0      | 0           | 0      | 0           | 0      |
| Site-Generated Trips [veh/h]            | 0                 | 0      | 0           | 0      | 0           | 0      |
| Diverted Trips [veh/h]                  | 0                 | 0      | 0           | 0      | 0           | 0      |
| Pass-by Trips [veh/h]                   | 0                 | 0      | 0           | 0      | 0           | 0      |
| Existing Site Adjustment Volume [veh/h] | 0                 | 0      | 0           | 0      | 0           | 0      |
| Other Volume [veh/h]                    | 0                 | 0      | 0           | 0      | 0           | 0      |
| Total Hourly Volume [veh/h]             | 55                | 43     | 64          | 391    | 807         | 117    |
| Peak Hour Factor                        | 0.9200            | 0.9200 | 0.9200      | 0.9200 | 0.9200      | 0.9200 |
| Other Adjustment Factor                 | 1.0000            | 1.0000 | 1.0000      | 1.0000 | 1.0000      | 1.0000 |
| Total 15-Minute Volume [veh/h]          | 15                | 12     | 17          | 106    | 219         | 32     |
| Total Analysis Volume [veh/h]           | 60                | 47     | 70          | 425    | 877         | 127    |
| Pedestrian Volume [ped/h]               | 0                 |        | 0           |        | 0           |        |

**Intersection Settings**

|                                    |      |      |      |
|------------------------------------|------|------|------|
| Priority Scheme                    | Stop | Free | Free |
| Flared Lane                        |      |      |      |
| Storage Area [veh]                 | 0    | 0    | 0    |
| Two-Stage Gap Acceptance           | No   |      |      |
| Number of Storage Spaces in Median | 0    | 0    | 0    |

**Movement, Approach, & Intersection Results**

|                                       |       |       |       |      |      |      |
|---------------------------------------|-------|-------|-------|------|------|------|
| V/C, Movement V/C Ratio               | 0.49  | 0.15  | 0.10  | 0.00 | 0.01 | 0.00 |
| d_M, Delay for Movement [s/veh]       | 60.78 | 18.40 | 10.73 | 0.00 | 0.00 | 0.00 |
| Movement LOS                          | F     | C     | B     | A    | A    | A    |
| 95th-Percentile Queue Length [veh/ln] | 2.27  | 0.52  | 0.33  | 0.00 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [ft/ln]  | 56.68 | 12.94 | 8.33  | 0.00 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh]           | 42.17 |       | 1.52  |      | 0.00 |      |
| Approach LOS                          | E     |       | A     |      | A    |      |
| d_I, Intersection Delay [s/veh]       | 3.28  |       |       |      |      |      |
| Intersection LOS                      | F     |       |       |      |      |      |

WARRANTS

ATTACHMENT E

Intelligent Infrastructure.  
Enduring Communities.





| TURN LANE WARRANTS |                    | Mullan Rd &<br>Chuck Wagon Dr |     | George Elmer Dr &<br>England Blvd |     |
|--------------------|--------------------|-------------------------------|-----|-----------------------------------|-----|
|                    |                    | AM                            | PM  | AM                                | PM  |
| 2025               | EB Right-Turn Lane |                               |     |                                   |     |
|                    | EB Left-Turn Lane  |                               |     |                                   |     |
|                    | WB Right-Turn Lane | NO                            | YES |                                   |     |
|                    | WB Left-Turn Lane  |                               |     |                                   |     |
| 2030               | EB Right-Turn Lane |                               |     | NO                                | NO  |
|                    | EB Left-Turn Lane  |                               |     |                                   |     |
|                    | WB Right-Turn Lane | NO                            | YES |                                   |     |
|                    | WB Left-Turn Lane  |                               |     | NO                                | YES |

Existing Traffic Volumes (2025) - Right-Turn Lanes at Unsignalized Intersections on 2-Lane Highways

| Approach                | Time       | Total DHV<br>(veh/hr) | Right-Turn Volume<br>During DHV<br>(veh/hr, one direction) | Required Right-Turn<br>Volume for<br>Warranted Lane | Warranted Right-<br>Turn Lane?<br>(Y/N) |
|-------------------------|------------|-----------------------|--|---|---|
| Mullan & Chuck Wagon WB | AM weekday | 198                   | 22   | 94  | N                                       |
|                         | PM weekday | 780                   | 54   | 40  | Y                                       |

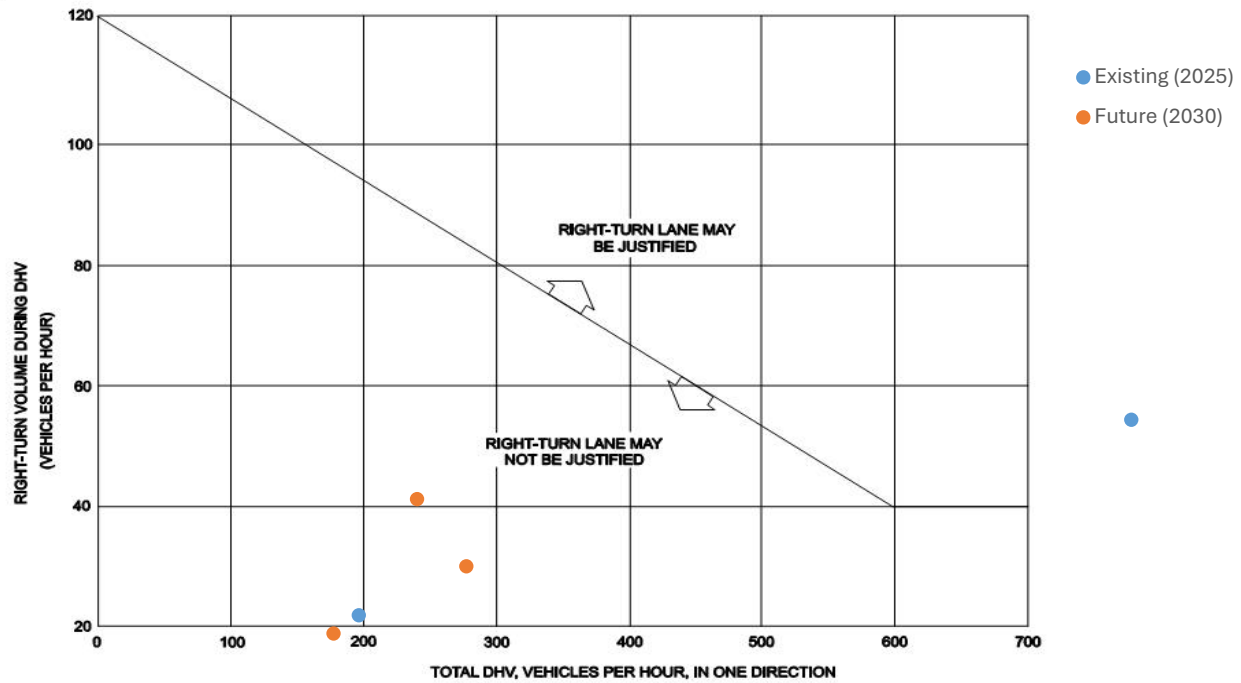
| Speed Limit<br>at Approach | Adjustment |
|----------------------------|------------|
| 45                         | 0          |
| 45                         | 0          |

Future Traffic Volumes (2030) - Right-Turn Lanes at Unsignalized Intersections on 2-Lane Highways

| Approach                  | Time       | Total DHV<br>(veh/hr) | Right-Turn Volume<br>During DHV<br>(veh/hr, one direction) | Required Right-Turn<br>Volume for<br>Warranted Lane | Warranted Right-<br>Turn Lane?<br>(Y/N) |
|---------------------------|------------|-----------------------|--|---|---|
| Mullan & Chuck Wagon WB   | AM weekday | 242                   | 41   | 108   | N                                       |
|                           | PM weekday | 924                   | 117  | 40  | Y                                       |
| George Elmer & England EB | AM weekday | 279                   | 30   | 83  | N                                       |
|                           | PM weekday | 179                   | 19   | 96  | N                                       |

| Speed Limit<br>at Approach | Adjustment |
|----------------------------|------------|
| 45                         | 20         |
| 45                         | 0          |
| 30                         | 0          |
| 30                         | 0          |

## Guidelines for Right-Turn Lanes at Unsignalized Intersections on 2-Lane Highways (Figure 28.4A)



Existing Traffic Volumes (2025) - Left-Turn Lanes at Unsignalized Intersections on 2-Lane Highways

| Approach                | Time       | Va = Total advancing traffic volume | Val = Total left-turn volume in advancing traffic | Percent left-turns in Va | Vo = Total opposing traffic volume | Warranted Left-Turn Lane? (Y/N) | Speed Limit at Approach |
|-------------------------|------------|-------------------------------------|---|--------------------------|------------------------------------|---------------------------------|-------------------------|
| Mullan & Chuck Wagon EB | AM weekday | 824                                 | 7   | 0.8%                     | 198                                | N                               | 45                      |
|                         | PM weekday | 357                                 | 10  | 2.8%                     | 780                                | N                               | 45                      |
|                         | AM weekday |                                     |   | #DIV/0!                  |                                    |                                 |                         |
|                         | PM weekday |                                     |   | #DIV/0!                  |                                    |                                 |                         |
|                         | AM weekday |                                     |   | #DIV/0!                  |                                    |                                 |                         |
|                         | PM weekday |                                     |   | #DIV/0!                  |                                    |                                 |                         |
|                         | AM weekday |                                     |   | #DIV/0!                  |                                    |                                 |                         |
|                         | PM weekday |                                     |   | #DIV/0!                  |                                    |                                 |                         |
|                         | AM weekday |                                     |   | #DIV/0!                  |                                    |                                 |                         |
|                         | PM weekday |                                     |   | #DIV/0!                  |                                    |                                 |                         |

| Approach                         | Time       | Va = Total advancing traffic volume | Val = Total left-turn volume in advancing traffic | Percent left-turns in Va | Vo = Total opposing traffic volume | Warranted Left-Turn Lane? (Y/N) |
|----------------------------------|------------|-------------------------------------|---|--------------------------|------------------------------------|---------------------------------|
| Mullan & Chuck Wagon EB          | AM weekday | 927                                 | 23  | 2.5%                     | 242                                | Y                               |
|                                  | PM weekday | 455                                 | 64  | 14.1%                    | 924                                | Y                               |
| George Elmer & England WB        | AM weekday | 182                                 | 101   | 55.5%                    | 279                                | N                               |
|                                  | PM weekday | 723                                 | 453   | 62.7%                    | 179                                | Y                               |
| George Elmer & England WB<br>10% | AM weekday | 81                                  | 73  | 90.1%                    | 28                                 |                                 |
|                                  | PM weekday | 385                                 | 358   | 93.0%                    | 18                                 | Y                               |
| George Elmer & England WB<br>20% | AM weekday | 92                                  | 76  | 82.6%                    | 56                                 |                                 |
|                                  | PM weekday | 422                                 | 368   | 87.2%                    | 36                                 | Y                               |
| George Elmer & England WB<br>30% | AM weekday | 103                                 | 79  | 76.7%                    | 84                                 |                                 |
|                                  | PM weekday | 460                                 | 379   | 82.4%                    | 54                                 | Y                               |

45

45

30

30

30

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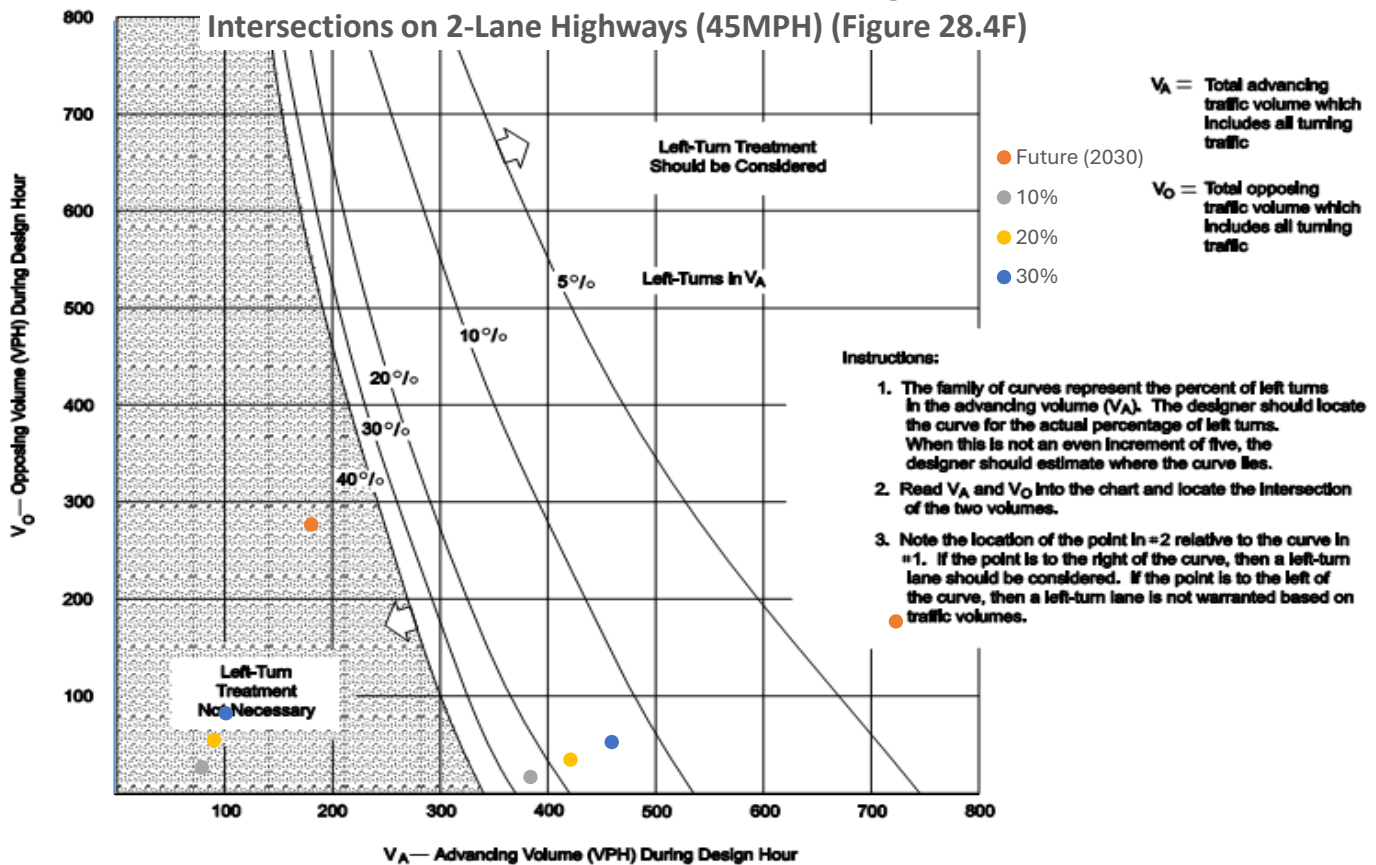
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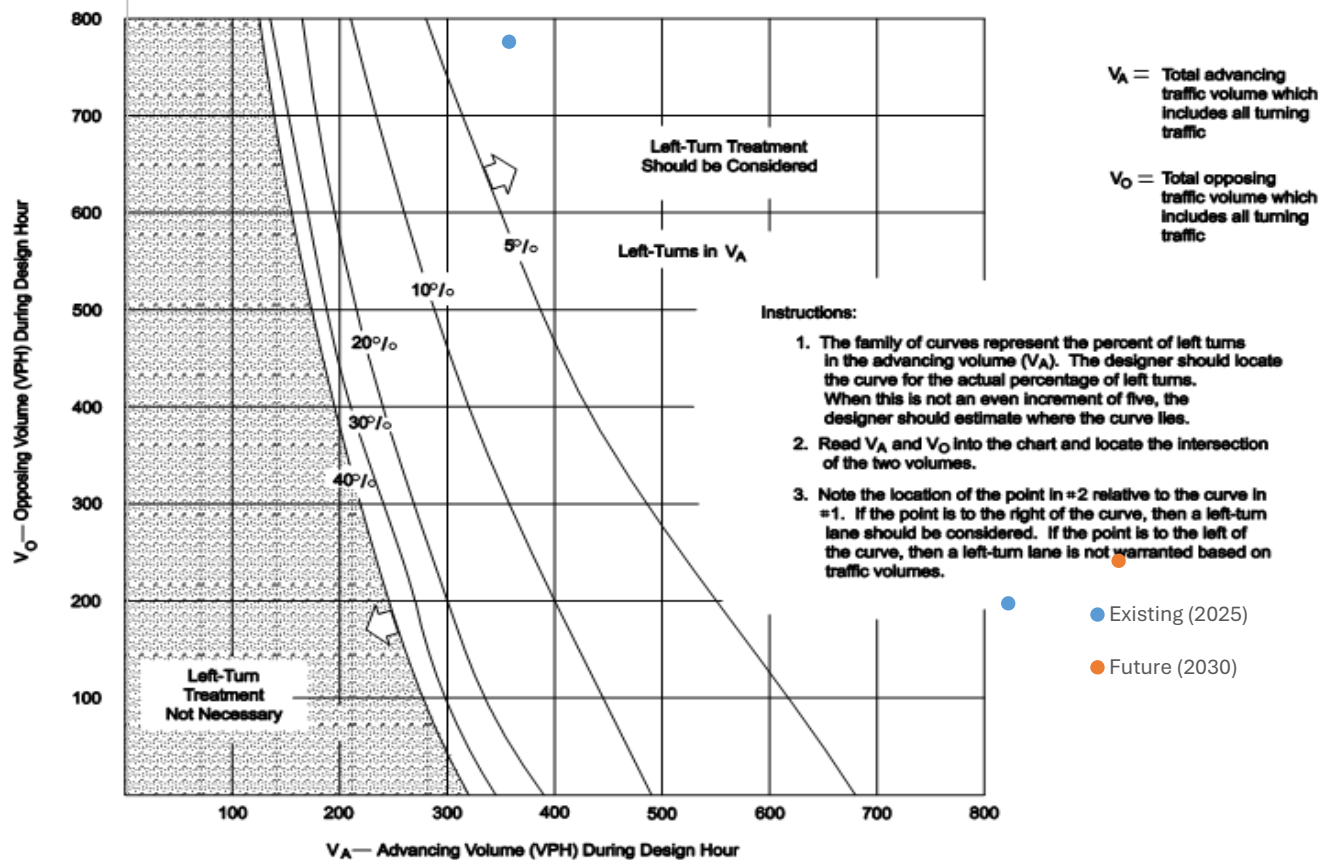
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warranted

Volume Guidelines for Left-Turn Lanes at Unsignalized Intersections on 2-Lane Highways (45MPH) (Figure 28.4F)



## Volume Guidelines for Left-Turn Lanes at Unsignalized Intersections on 2-Lane Highways (50MPH) (Figure 28.4E)





## Warrant 1: Eight-Hour Vehicular Volume

### General Information

Agency/Company: Sanbell  
 Date: 2/20/2025  
 Project Number: 250155  
 Project Description: Paisley Park  
 Jurisdiction: City of Missoula  
 Major Street Speed Limit: 45 mph  
 Major Street (Approach Lanes): Mullan Rd (1 lane)  
 Minor Street (Approach Lanes): Chuck Wagon Dr (2 lanes)  
 Analysis Year/Case: Existing (2025)

| Hour Begin   | Avg. Entering Volume |            |             |             | Major Street Total (Both Approaches) | Higher Volume Minor Approach |
|--------------|----------------------|------------|-------------|-------------|--------------------------------------|------------------------------|
|              | NB                   | SB         | EB          | WB          |                                      |                              |
| 0:00         | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 1:00         | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 2:00         | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 3:00         | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 4:00         | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 5:00         | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 6:00         | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 7:00         | 0                    | 45         | 782         | 155         | 937                                  | 45                           |
| 8:00         | 0                    | 52         | 620         | 250         | 870                                  | 52                           |
| 9:00         | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 10:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 11:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 12:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 13:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 14:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 15:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 16:00        | 0                    | 40         | 346         | 699         | 1045                                 | 40                           |
| 17:00        | 0                    | 29         | 358         | 780         | 1138                                 | 29                           |
| 18:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 19:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 20:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 21:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 22:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 23:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| <b>TOTAL</b> | <b>0</b>             | <b>166</b> | <b>2106</b> | <b>1884</b> | <b>3990</b>                          | <b>166</b>                   |

#### Condition A - Minimum Vehicular Volume (70% Columns):

Major Street Total > 350 and Higher Minor Street Total > 140 for 8 hours?

No 0

#### Condition B - Interruption of Continuous Traffic (70% Columns):

Major Street Total > 525 and Higher Minor Street Total > 70 for 8 hours?

No 0

#### Combination of Conditions A & B (56% Columns):

Major Street Total > 280 and Higher Minor Street Total > 112 for 8 hours?

No 0

Major Street Total > 420 and Higher Minor Street Total > 56 for 8 hours?

No 0

**Warrant 1 Satisfied?**

**N/A**

## Warrant 1: Eight-Hour Vehicular Volume

### General Information

Agency/Company: Sanbell  
 Date: 2/20/2025  
 Project Number: 250155  
 Project Description: Paisley Park  
 Jurisdiction: City of Missoula  
 Major Street Speed Limit: 45 mph  
 Major Street (Approach Lanes): Mullan Rd (1 lane)  
 Minor Street (Approach Lanes): Chuck Wagon Dr (2 lanes)  
 Analysis Year/Case: Future (2030)

| Hour Begin   | Avg. Entering Volume |            |             |             | Major Street Total (Both Approaches) | Higher Volume Minor Approach |
|--------------|----------------------|------------|-------------|-------------|--------------------------------------|------------------------------|
|              | NB                   | SB         | EB          | WB          |                                      |                              |
| 0:00         | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 1:00         | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 2:00         | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 3:00         | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 4:00         | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 5:00         | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 6:00         | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 7:00         | 0                    | 142        | 915         | 185         | 1100                                 | 142                          |
| 8:00         | 0                    | 164        | 726         | 298         | 1024                                 | 164                          |
| 9:00         | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 10:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 11:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 12:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 13:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 14:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 15:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 16:00        | 0                    | 126        | 405         | 833         | 1238                                 | 126                          |
| 17:00        | 0                    | 92         | 419         | 930         | 1349                                 | 92                           |
| 18:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 19:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 20:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 21:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 22:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 23:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| <b>TOTAL</b> | <b>0</b>             | <b>524</b> | <b>2465</b> | <b>2246</b> | <b>4711</b>                          | <b>524</b>                   |

#### Condition A - Minimum Vehicular Volume (70% Columns):

Major Street Total > 350 and Higher Minor Street Total > 140 for 8 hours?

No

Hrs

2

#### Condition B - Interruption of Continuous Traffic (70% Columns):

Major Street Total > 525 and Higher Minor Street Total > 70 for 8 hours?

No

4

#### Combination of Conditions A & B (56% Columns):

Major Street Total > 280 and Higher Minor Street Total > 112 for 8 hours?

No

3

Major Street Total > 420 and Higher Minor Street Total > 56 for 8 hours?

No

4

**Warrant 1 Satisfied?**

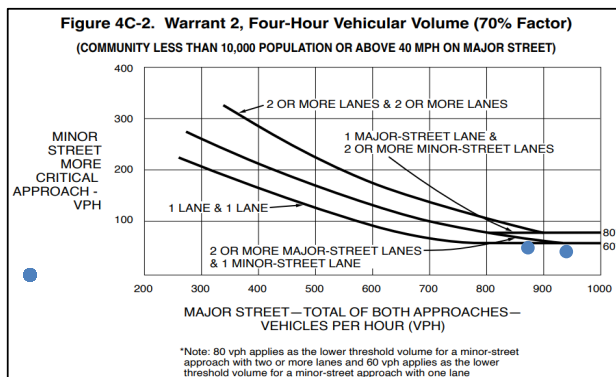
**N/A**

## Warrant 2: Four-Hour Vehicular Volume

### General Information

Agency/Company: Sanbell  
 Date: 2/20/2025  
 Project Number: 250155  
 Project Description: Paisley Park  
 Jurisdiction: City of Missoula  
 Major Street Speed Limit: 45 mph  
 Major Street (Approach Lanes): Mullan Rd (1 lane)  
 Minor Street (Approach Lanes): Chuck Wagon Dr (2 lanes)  
 Analysis Year/Case: Existing (2025)

| Hour Begin   | Avg. Entering Volume |            |             |             | Major Street Total (Both Approaches) | Higher Volume Minor Approach |
|--------------|----------------------|------------|-------------|-------------|--------------------------------------|------------------------------|
|              | NB                   | SB         | EB          | WB          |                                      |                              |
| 0:00         | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 1:00         | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 2:00         | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 3:00         | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 4:00         | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 5:00         | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 6:00         | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 7:00         | 0                    | 45         | 782         | 155         | 937                                  | 45                           |
| 8:00         | 0                    | 52         | 620         | 250         | 870                                  | 52                           |
| 9:00         | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 10:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 11:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 12:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 13:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 14:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 15:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 16:00        | 0                    | 40         | 346         | 699         | 1045                                 | 40                           |
| 17:00        | 0                    | 29         | 358         | 780         | 1138                                 | 29                           |
| 18:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 19:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 20:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 21:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 22:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 23:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| <b>TOTAL</b> | <b>0</b>             | <b>166</b> | <b>2106</b> | <b>1884</b> | <b>3990</b>                          | <b>166</b>                   |



Meets warrant criteria on graph for minimum of 4 hours (70% thresholds)?

**Warrant 2 Satisfied?**

**No (0 hrs)**

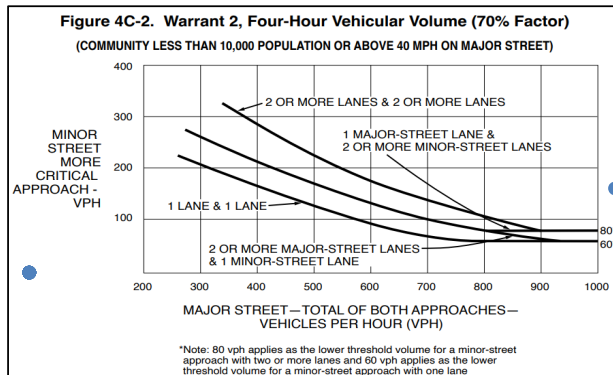
**No**

## Warrant 2: Four-Hour Vehicular Volume

### General Information

Agency/Company: Sanbell  
 Date: 2/20/2025  
 Project Number: 250155  
 Project Description: Paisley Park  
 Jurisdiction: City of Missoula  
 Major Street Speed Limit: 45 mph  
 Major Street (Approach Lanes): Mullan Rd (1 lane)  
 Minor Street (Approach Lanes): Chuck Wagon Dr (2 lanes)  
 Analysis Year/Case: Future (2030)

| Hour Begin   | Avg. Entering Volume |            |             |             | Major Street Total (Both Approaches) | Higher Volume Minor Approach |
|--------------|----------------------|------------|-------------|-------------|--------------------------------------|------------------------------|
|              | NB                   | SB         | EB          | WB          |                                      |                              |
| 0:00         | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 1:00         | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 2:00         | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 3:00         | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 4:00         | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 5:00         | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 6:00         | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 7:00         | 0                    | 142        | 915         | 185         | 1100                                 | 142                          |
| 8:00         | 0                    | 164        | 726         | 298         | 1024                                 | 164                          |
| 9:00         | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 10:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 11:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 12:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 13:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 14:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 15:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 16:00        | 0                    | 126        | 405         | 833         | 1238                                 | 126                          |
| 17:00        | 0                    | 92         | 419         | 930         | 1349                                 | 92                           |
| 18:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 19:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 20:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 21:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 22:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| 23:00        | 0                    | 0          | 0           | 0           | 0                                    | 0                            |
| <b>TOTAL</b> | <b>0</b>             | <b>524</b> | <b>2465</b> | <b>2246</b> | <b>4711</b>                          | <b>524</b>                   |



Meets warrant criteria on graph for minimum of 4 hours (100% thresholds)?  
**Warrant 2 Satisfied?**

**Yes (4 hrs)**  
**Yes**

## Warrant 3: Peak Hour

### General Information

Agency/Company: Sanbell  
 Date: 2/20/2025  
 Project Number: 250155  
 Project Description: Paisley Park  
 Jurisdiction: City of Missoula  
 Major Street Speed Limit: 45 mph  
 Major Street (Approach Lanes): Mullan Rd (1 lane)  
 Minor Street (Approach Lanes): Chuck Wagon Dr (2 lanes)  
 Analysis Year/Case: Existing (2025)

#### AM Peak Hour 7:00 - 8:00 AM

|   |      |
|---|------|
| High Minor Total Stopped Time Delay (hrs) | 0.32 |
| Total Volume of Major Approaches (vehs)   | 1022 |
| High Minor Approach Volume (vehs)         | 53   |
| Total Entering Volume (vehs)              | 1075 |

#### PM Peak Hour 5:00 - 6:00 PM

|   |      |
|---|------|
| High Minor Total Stopped Time Delay (hrs) | 0.17 |
| Total Volume of Major Approaches (vehs)   | 1137 |
| High Minor Approach Volume (vehs)         | 29   |
| Total Entering Volume (vehs)              | 1166 |

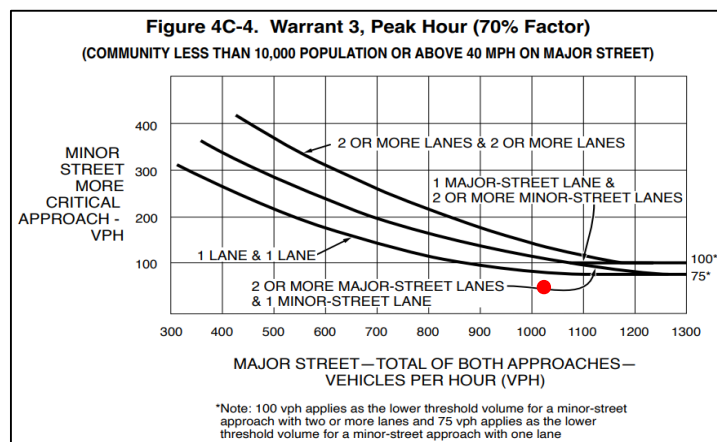
**Category A:** Peak Period: AM  
 Total stopped time delay for minor approach > 5 veh-hrs?  
 High minor approach volume > 150 for peak hour?  
 Total entering volume > 650 for peak hour?

**No (0.32)**  
**No (53)**  
**Yes (1075)**

Category A warrant satisfied?

**No**

### Category B:



Meets warrant criteria on graph for minimum of one hour (70% thresholds)?

**No**

**Warrant 3 Satisfied?**

**No**

## Warrant 3: Peak Hour

### General Information

Agency/Company: Sanbell  
 Date: 2/20/2025  
 Project Number: 250155  
 Project Description: Paisley Park  
 Jurisdiction: City of Missoula  
 Major Street Speed Limit: 45 mph  
 Major Street (Approach Lanes): Mullan Rd (1 lane)  
 Minor Street (Approach Lanes): Chuck Wagon Dr (2 lanes)  
 Analysis Year/Case: Future (2030)

#### AM Peak Hour 7:00 - 8:00 AM

|   |      |
|---|------|
| High Minor Total Stopped Time Delay (hrs) | 1.57 |
| Total Volume of Major Approaches (vehs)   | 1169 |
| High Minor Approach Volume (vehs)         | 161  |
| Total Entering Volume (vehs)              | 1330 |

#### PM Peak Hour 5:00 - 6:00 PM

|   |      |
|---|------|
| High Minor Total Stopped Time Delay (hrs) | 1.15 |
| Total Volume of Major Approaches (vehs)   | 1379 |
| High Minor Approach Volume (vehs)         | 98   |
| Total Entering Volume (vehs)              | 1477 |

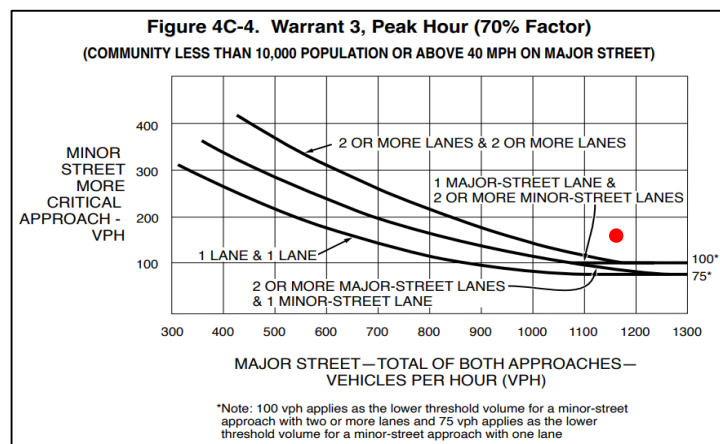
**Category A:** Peak Period: AM  
 Total stopped time delay for minor approach > 5 veh-hrs?  
 High minor approach volume > 150 for peak hour?  
 Total entering volume > 650 for peak hour?

No (1.57)  
 Yes (161)  
 Yes (1330)

Category A warrant satisfied?

No

### Category B:



Meets warrant criteria on graph for minimum of one hour (70% thresholds)?

Yes

**Warrant 3 Satisfied?**

**Yes**

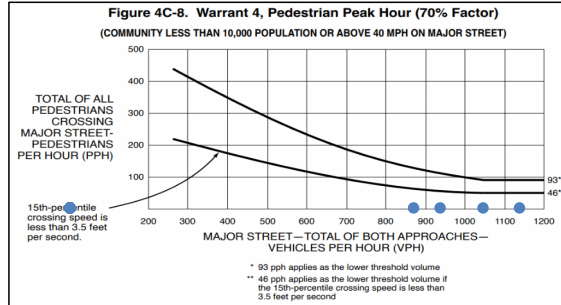
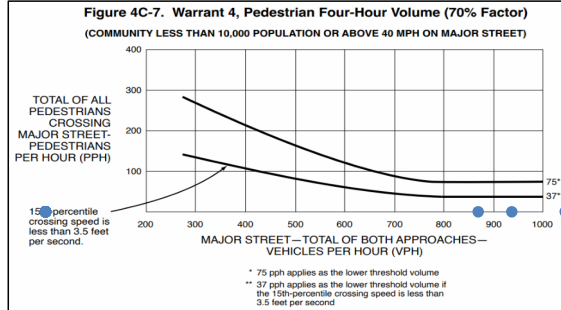
## Warrant 4: Pedestrian Volume

### General Information

Agency/Company: Sanbell  
 Date: 2/20/2025  
 Project Number: 250155  
 Project Description: Paisley Park  
 Jurisdiction: City of Missoula  
 Major Street Speed Limit: 45 mph  
 Major Street (Approach Lanes): Mullan Rd (1 lane)  
 Minor Street (Approach Lanes): Chuck Wagon Dr (2 lanes)  
 Analysis Year/Case: Existing (2025)

This warrant is intended for application where the traffic volume on a major street is so heavy that pedestrians experience excessive delay in crossing the major street.

| Hour Begin | Major Street Total Traffic | Pedestrian Volume Crossing Major Street |
|------------|----------------------------|---|
| 0:00       | 0                          | 0                                       |
| 1:00       | 0                          | 0                                       |
| 2:00       | 0                          | 0                                       |
| 3:00       | 0                          | 0                                       |
| 4:00       | 0                          | 0                                       |
| 5:00       | 0                          | 0                                       |
| 6:00       | 0                          | 0                                       |
| 7:00       | 937                        | 0                                       |
| 8:00       | 870                        | 0                                       |
| 9:00       | 0                          | 0                                       |
| 10:00      | 0                          | 0                                       |
| 11:00      | 0                          | 0                                       |
| 12:00      | 0                          | 0                                       |
| 13:00      | 0                          | 0                                       |
| 14:00      | 0                          | 0                                       |
| 15:00      | 0                          | 0                                       |
| 16:00      | 1045                       | 0                                       |
| 17:00      | 1138                       | 0                                       |
| 18:00      | 0                          | 0                                       |
| 19:00      | 0                          | 0                                       |
| 20:00      | 0                          | 0                                       |
| 21:00      | 0                          | 0                                       |
| 22:00      | 0                          | 0                                       |
| 23:00      | 0                          | 0                                       |
| TOTAL      | 3,990                      | 0                                       |



For each of any 4 hours of an average day, do the plotted points representing the vehicles per hour on the major street and the corresponding pedestrians per hour crossing the major street fall above the curve in Figure 4C-5? **No**

For 1 hour of an average day, does the plotted point representing vehicles per hour on the major street and the corresponding pedestrians per hour crossing the major street fall above the curve in Figure 4C-6? **No**

Warrant 4 Satisfied?

**N/A**

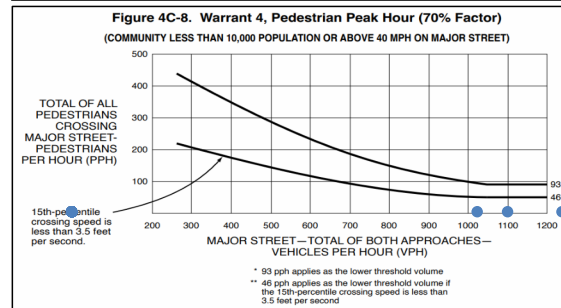
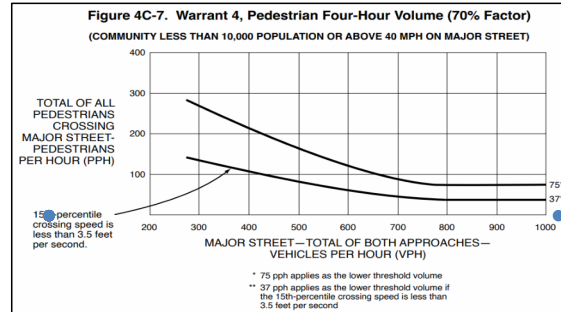
## Warrant 4: Pedestrian Volume

### General Information

Agency/Company: Sanbell  
 Date: 2/20/2025  
 Project Number: 250155  
 Project Description: Paisley Park  
 Jurisdiction: City of Missoula  
 Major Street Speed Limit: 45 mph  
 Major Street (Approach Lanes): Mullan Rd (1 lane)  
 Minor Street (Approach Lanes): Chuck Wagon Dr (2 lanes)  
 Analysis Year/Case: Future (2030)

This warrant is intended for application where the traffic volume on a major street is so heavy that pedestrians experience excessive delay in crossing the major street.

| Hour Begin   | Major Street Total Traffic | Pedestrian Volume Crossing Major Street |
|--------------|----------------------------|---|
| 0:00         | 0                          | 0                                       |
| 1:00         | 0                          | 0                                       |
| 2:00         | 0                          | 0                                       |
| 3:00         | 0                          | 0                                       |
| 4:00         | 0                          | 0                                       |
| 5:00         | 0                          | 0                                       |
| 6:00         | 0                          | 0                                       |
| 7:00         | 1100                       | 0                                       |
| 8:00         | 1024                       | 0                                       |
| 9:00         | 0                          | 0                                       |
| 10:00        | 0                          | 0                                       |
| 11:00        | 0                          | 0                                       |
| 12:00        | 0                          | 0                                       |
| 13:00        | 0                          | 0                                       |
| 14:00        | 0                          | 0                                       |
| 15:00        | 0                          | 0                                       |
| 16:00        | 1238                       | 0                                       |
| 17:00        | 1349                       | 0                                       |
| 18:00        | 0                          | 0                                       |
| 19:00        | 0                          | 0                                       |
| 20:00        | 0                          | 0                                       |
| 21:00        | 0                          | 0                                       |
| 22:00        | 0                          | 0                                       |
| 23:00        | 0                          | 0                                       |
| <b>TOTAL</b> | <b>4,711</b>               | <b>0</b>                                |



For each of any 4 hours of an average day, do the plotted points representing the vehicles per hour on the major street and the corresponding pedestrians per hour crossing the major street fall above the curve in Figure 4C-5? **No**

For 1 hour of an average day, does the plotted point representing vehicles per hour on the major street and the corresponding pedestrians per hour crossing the major street fall above the curve in Figure 4C-6? **No**

Warrant 4 Satisfied?

**N/A**



| General Information   |                          |
|---|--------------------------|
| Agency/Company:   | Sanbell                  |
| Date:   | 2/20/2025                |
| Project Number:   | 250155                   |
| Project Description:  | Paisley Park             |
| Jurisdiction:   | City of Missoula         |
| Major Street Speed Limit:   | 45 mph                   |
| Major Street (Approach Lanes):  | Mullan Rd (1 lane)       |
| Minor Street (Approach Lanes):  | Chuck Wagon Dr (2 lanes) |
| Analysis Year/Case:   | Existing (2025)          |
| <b>Warrant 5: School Crossing</b>   |                          |
| <p>This warrant is intended for application where the fact that school children (elementary through high school students) cross the major street is the principle reason to consider installing a traffic signal. This warrant shall not be applied at locations where the distance to the nearest traffic control signal along the major street is less than 300 feet unless it can be shown that the proposed traffic signal would not restrict the progressive movement of traffic.</p> <p>Is the number of adequate gaps in the major crossing traffic stream during the primary crossing period less than the number of minutes in that crossing period? <b>N/A</b></p> <p>Do 20 or more students cross at this location during the highest crossing hour? <b>No</b></p> <p><b>Warrant 5 Satisfied? N/A</b></p>  |                          |
| <b>Warrant 6: Coordinated Signal System</b>   |                          |
| <p>This warrant is intended for application where installation of a traffic signal would help to provide proper platooning of vehicles and therefore provide progressive movement in a coordinated signal system.</p> <p>Are any adjacent traffic signals located so far away that they do not provide a necessary degree of platooning and/or progressive operation? <b>No</b></p> <p><b>Warrant 6 Satisfied? N/A</b></p>  |                          |
| <b>Warrant 7: Crash Experience</b>  |                          |
| <p>This warrant is intended for application where the severity and frequency of crashes are the principal reasons to consider installing a traffic control signal</p> <p>Have adequate trials of alternatives failed to reduce the crash frequency? <b>N/A</b></p> <p>Have at least one of the following conditions apply to the reported crash history:</p> <ol style="list-style-type: none"> <li>1. Do the number of reported angle crashes and pedestrian crashes within a 1-year period equal or exceed the threshold number in Table 4C-2 for total angle crashes and pedestrian crashes?</li> <li>2. Do the number of reported fatal-and-injury angle crashes and pedestrian crashes within a 1-year period equal or exceed the threshold number in Table 4C-2 for total fatal-and-injury angle crashes and pedestrian crashes?</li> <li>3. Do the number of reported angle crashes and pedestrian crashes within a 3-year period equal or exceed the threshold number in Table 4C-3 for total angle crashes and pedestrian crashes?</li> <li>4. Do the number of reported fatal-and-injury angle crashes and pedestrian crashes within a 3-year period equal or exceed the threshold number in Table 4C-3 for total fatal-and-injury angle crashes and pedestrian crashes?</li> </ol> <p><b>N/A</b></p> <p>Is Condition A criterion met for 80% columns of Warrant 1 met? <b>N/A</b></p> <p>Is Condition B criterion met for 80% columns of Warrant 1 met? <b>N/A</b></p> <p>Are observed pedestrian volumes equal to or greater than 80% of what is required for Warrant 4? <b>No</b></p> <p><b>Warrant 7 Satisfied? N/A</b></p> |                          |

| General Information   |                          |
|---|--------------------------|
| Agency/Company:   | Sanbell                  |
| Date:   | 2/20/2025                |
| Project Number:   | 250155                   |
| Project Description:  | Paisley Park             |
| Jurisdiction:   | City of Missoula         |
| Major Street Speed Limit:   | 45 mph                   |
| Major Street (Approach Lanes):  | Mullan Rd (1 lane)       |
| Minor Street (Approach Lanes):  | Chuck Wagon Dr (2 lanes) |
| Analysis Year/Case:   | Future (2030)            |
| <b>Warrant 5: School Crossing</b>   |                          |
| <p>This warrant is intended for application where the fact that school children (elementary through high school students) cross the major street is the principle reason to consider installing a traffic signal. This warrant shall not be applied at locations where the distance to the nearest traffic control signal along the major street is less than 300 feet unless it can be shown that the proposed traffic signal would not restrict the progressive movement of traffic.</p> <p>Is the number of adequate gaps in the major crossing traffic stream during the primary crossing period less than the number of minutes in that crossing period? <b>N/A</b></p> <p>Do 20 or more students cross at this location during the highest crossing hour? <b>No</b></p> <p><b>Warrant 5 Satisfied? N/A</b></p>  |                          |
| <b>Warrant 6: Coordinated Signal System</b>   |                          |
| <p>This warrant is intended for application where installation of a traffic signal would help to provide proper platooning of vehicles and therefore provide progressive movement in a coordinated signal system.</p> <p>Are any adjacent traffic signals located so far away that they do not provide a necessary degree of platooning and/or progressive operation? <b>No</b></p> <p><b>Warrant 6 Satisfied? N/A</b></p>  |                          |
| <b>Warrant 7: Crash Experience</b>  |                          |
| <p>This warrant is intended for application where the severity and frequency of crashes are the principal reasons to consider installing a traffic control signal</p> <p>Have adequate trials of alternatives failed to reduce the crash frequency? <b>N/A</b></p> <p>Have at least one of the following conditions apply to the reported crash history:</p> <ol style="list-style-type: none"> <li>1. Do the number of reported angle crashes and pedestrian crashes within a 1-year period equal or exceed the threshold number in Table 4C-2 for total angle crashes and pedestrian crashes?</li> <li>2. Do the number of reported fatal-and-injury angle crashes and pedestrian crashes within a 1-year period equal or exceed the threshold number in Table 4C-2 for total fatal-and-injury angle crashes and pedestrian crashes?</li> <li>3. Do the number of reported angle crashes and pedestrian crashes within a 3-year period equal or exceed the threshold number in Table 4C-3 for total angle crashes and pedestrian crashes?</li> <li>4. Do the number of reported fatal-and-injury angle crashes and pedestrian crashes within a 3-year period equal or exceed the threshold number in Table 4C-3 for total fatal-and-injury angle crashes and pedestrian crashes?</li> </ol> <p><b>N/A</b></p> <p>Is Condition A criterion met for 80% columns of Warrant 1 met? <b>N/A</b></p> <p>Is Condition B criterion met for 80% columns of Warrant 1 met? <b>N/A</b></p> <p>Are observed pedestrian volumes equal to or greater than 80% of what is required for Warrant 4? <b>No</b></p> <p><b>Warrant 7 Satisfied? N/A</b></p> |                          |

## General Information

Agency/Company: Sanbell  
Date: 2/20/2025  
Project Number: 250155  
Project Description: Paisley Park  
Jurisdiction: City of Missoula  
Major Street Speed Limit: 45 mph  
Major Street (Approach Lanes): Mullan Rd (1 lane)  
Minor Street (Approach Lanes): Chuck Wagon Dr (2 lanes)  
Analysis Year/Case: Existing (2025)

## Warrant 8: Roadway Network

This warrant is intended for application where installation of a traffic signal could be justified in order to encourage concentration and organization of traffic flow on a roadway network

Do two or more of the intersecting routes at this location have at least one of the following characteristics:

- A. It is part of the street or highway system that serves as the principal roadway network for through traffic flow; or
- B. It includes rural or suburban highways outside, entering, or traversing a City; or
- C. It appears as a major route on an official plan.

No

Does this intersection have an existing or immediately projected total entering volume of at least 1000 vehicles during a weekday typical peak hour and have a 5-year projected traffic volume that meets one or more of Warrants 1, 2, and 3 during an average weekday?

Yes

Does this intersection have an existing or immediately projected total entering volume of at least 1000 vph for each of any 5 hours of a Saturday or Sunday?

N/A

Warrant 8 Satisfied?

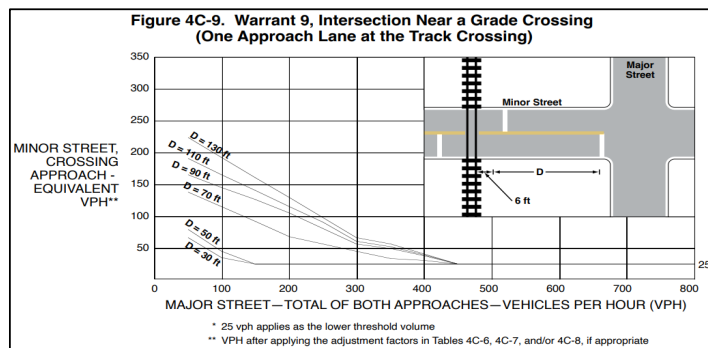
No

## Warrant 9: Intersection Near a Grade Crossing

This warrant is intended for application where none of the conditions described in the other eight traffic signal warrants are met, but the proximity to the intersection of a grade crossing on an intersection approach controlled by a STOP or YIELD sign is the principal reason to consider installing a traffic signal.

Does a grade crossing exist on an approach controlled by a STOP or YIELD sign whereby the center of the track nearest to the intersection is within 140 feet of the stop or yield line?

No



During the highest traffic volume hour during which the rail traffic uses the crossing, does the plotted point representing vehicles per hour on the major street and the corresponding vehicles per hour on the minor-street approach that crosses the track fall above the applicable curve in Figure 4C-9 or 4C-10 (whichever is applicable) for the existing combination of approach lanes over the track and the distance D, which is the clear storage distance?

N/A

Warrant 9 Satisfied?

N/A

## General Information

Agency/Company: Sanbell  
Date: 2/20/2025  
Project Number: 250155  
Project Description: Paisley Park  
Jurisdiction: City of Missoula  
Major Street Speed Limit: 45 mph  
Major Street (Approach Lanes): Mullan Rd (1 lane)  
Minor Street (Approach Lanes): Chuck Wagon Dr (2 lanes)  
Analysis Year/Case: Future (2030)

## Warrant 8: Roadway Network

This warrant is intended for application where installation of a traffic signal could be justified in order to encourage concentration and organization of traffic flow on a roadway network

Do two or more of the intersecting routes at this location have at least one of the following characteristics:

- A. It is part of the street or highway system that serves as the principal roadway network for through traffic flow; or
- B. It includes rural or suburban highways outside, entering, or traversing a City; or
- C. It appears as a major route on an official plan.

No

Does this intersection have an existing or immediately projected total entering volume of at least 1000 vehicles during a weekday typical peak hour and have a 5-year projected traffic volume that meets one or more of Warrants 1, 2, and 3 during an average weekday?

Yes

Does this intersection have an existing or immediately projected total entering volume of at least 1000 vph for each of any 5 hours of a Saturday or Sunday?

N/A

Warrant 8 Satisfied?

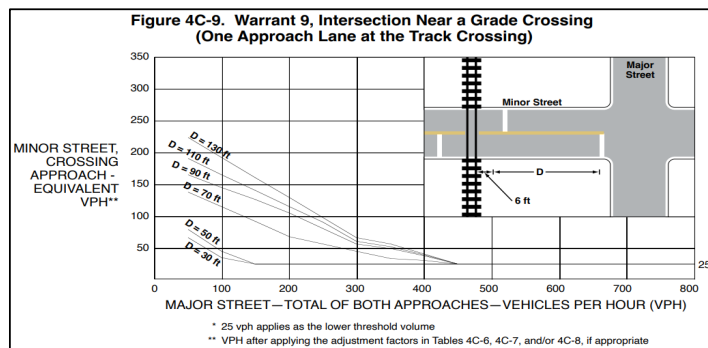
No

## Warrant 9: Intersection Near a Grade Crossing

This warrant is intended for application where none of the conditions described in the other eight traffic signal warrants are met, but the proximity to the intersection of a grade crossing on an intersection approach controlled by a STOP or YIELD sign is the principal reason to consider installing a traffic signal.

Does a grade crossing exist on an approach controlled by a STOP or YIELD sign whereby the center of the track nearest to the intersection is within 140 feet of the stop or yield line?

No



During the highest traffic volume hour during which the rail traffic uses the crossing, does the plotted point representing vehicles per hour on the major street and the corresponding vehicles per hour on the minor-street approach that crosses the track fall above the applicable curve in Figure 4C-9 or 4C-10 (whichever is applicable) for the existing combination of approach lanes over the track and the distance D, which is the clear storage distance?

N/A

Warrant 9 Satisfied?

N/A

## Warrant 3: Peak Hour

### General Information

Agency/Company: Sanbell  
 Date: 2/20/2025  
 Project Number: 250155  
 Project Description: Paisley Park  
 Jurisdiction: City of Missoula  
 Major Street Speed Limit: 45 mph  
 Major Street (Approach Lanes): England Blvd (1 lane)  
 Minor Street (Approach Lanes): George Elmer Dr (1 lane)  
 Analysis Year/Case: Future (2030)

#### AM Peak Hour 7:00 - 8:00 AM

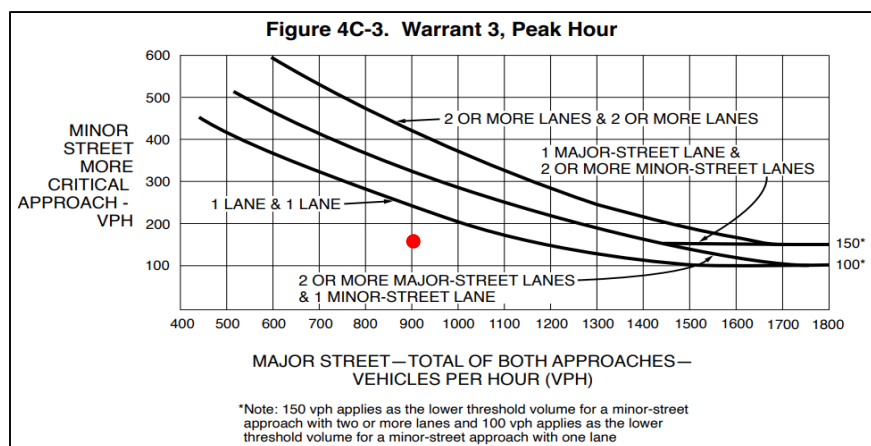
|   |      |
|---|------|
| High Minor Total Stopped Time Delay (hrs) | 1.53 |
| Total Volume of Major Approaches (vehs)   | 461  |
| High Minor Approach Volume (vehs)         | 360  |
| Total Entering Volume (vehs)              | 821  |

#### PM Peak Hour 5:00 - 6:00 PM

|   |      |
|---|------|
| High Minor Total Stopped Time Delay (hrs) | 1.53 |
| Total Volume of Major Approaches (vehs)   | 902  |
| High Minor Approach Volume (vehs)         | 165  |
| Total Entering Volume (vehs)              | 1067 |

**Category A:** Peak Period: PM  
 Total stopped time delay for minor approach > 4 veh-hrs? **No (1.53)**  
 High minor approach volume > 100 for peak hour? **Yes (165)**  
 Total entering volume > 650 for peak hour? **Yes (1067)**  
 Category A warrant satisfied? **No**

### Category B:



Meets warrant criteria on graph for minimum of one hour (100% thresholds)? **No**

**Warrant 3 Satisfied?** **No**

**CAPACITY CALCULATIONS –  
FUTURE IMPROVED (2030)**




**ATTACHMENT F**

Intelligent Infrastructure.  
Enduring Communities.



| Intersection                   | Approach     | Future with Improvements (2030)                    |     |                    |                   |     |                    |
|--------------------------------|--------------|--|-----|--------------------|-------------------|-----|--------------------|
|                                |              | AM Peak  |     |                    | PM Peak           |     |                    |
|                                |              | Avg Delay (s/veh)                                  | LOS | 95th % Queue (veh) | Avg Delay (s/veh) | LOS | 95th % Queue (veh) |
| Intersection Control           |              | One-Way Stop-Control (NB), WB Left-Turn Lane       |     |                    |                   |     |                    |
| England Blvd & George Elmer Dr | NB           | 15.3   | C   | 4                  | 28.9              | D   | 4                  |
|                                | EB           | 0.0  | A   | 0                  | 0.0               | A   | 0                  |
|                                | WB           | 4.5  | A   | 1                  | 5.7               | A   | 2                  |
|                                | Intersection | 7.7  | A   | --                 | 8.3               | A   | --                 |
| Intersection Control           |              | One-Way Stop-Control (NB), WB LT, NB LT & RT Lanes |     |                    |                   |     |                    |
| England Blvd & George Elmer Dr | NB           | 14.6   | B   | 3                  | 21.2              | C   | 2                  |
|                                | EB           | 0.0  | A   | 0                  | 0.0               | A   | 0                  |
|                                | WB           | 4.5  | A   | 1                  | 5.7               | A   | 2                  |
|                                | Intersection | 7.4  | A   | --                 | 7.1               | A   | --                 |
| Intersection Control           |              | All-Way Stop-Control                               |     |                    |                   |     |                    |
| England Blvd & George Elmer Dr | NB           | 12.5   | B   | 3                  | 11.0              | B   | 2                  |
|                                | EB           | 12.2   | B   | 3                  | 10.5              | B   | 2                  |
|                                | WB           | 10.9   | B   | 2                  | 73.9              | F   | 21                 |
|                                | Intersection | 12.0   | B   | --                 | 53.5              | F   | --                 |
| Intersection Control           |              | Roundabout   |     |                    |                   |     |                    |
| England Blvd & George Elmer Dr | NB           | 7.6  | A   | 2                  | 4.6               | A   | 1                  |
|                                | EB           | 5.3  | A   | 1                  | 7.0               | A   | 1                  |
|                                | WB           | 3.9  | A   | 1                  | 9.8               | A   | 5                  |
|                                | Intersection | 6.0  | A   | --                 | 8.6               | A   | --                 |
| Intersection Control           |              | One-Way Stop-Control (SB), WB Right-Turn Lane      |     |                    |                   |     |                    |
| Mullan Rd & Chuck Wagon Dr     | SB           | 33.2   | D   | 4                  | 37.2              | E   | 3                  |
|                                | EB           | 0.2  | A   | 1                  | 1.5               | A   | 1                  |
|                                | WB           | 0.0  | A   | 0                  | 0.0               | A   | 0                  |
|                                | Intersection | 4.2  | A   | --                 | 2.9               | A   | --                 |
| Intersection Control           |              | Signalized   |     |                    |                   |     |                    |
| Mullan Rd & Chuck Wagon Dr     | SB           | 16.2   | B   | 2                  | 18.9              | B   | 1                  |
|                                | EB           | 8.0  | A   | 2                  | 4.1               | A   | 1                  |
|                                | WB           | 2.7  | A   | 1                  | 6.0               | A   | 2                  |
|                                | Intersection | 8.0  | A   | --                 | 6.3               | A   | --                 |
| Intersection Control           |              | Roundabout   |     |                    |                   |     |                    |
| Mullan Rd & Chuck Wagon Dr     | SB           | 3.8  | A   | 1                  | 6.8               | A   | 1                  |
|                                | EB           | 15.5   | C   | 9                  | 5.2               | A   | 2                  |
|                                | WB           | 4.5  | A   | 1                  | 16.0              | C   | 9                  |
|                                | Intersection | 12.1   | B   | --                 | 12.0              | B   | --                 |

## Option 1: WB Left-Turn Lane

|                               |   |       |  |       |   |      |
|-------------------------------|---|-------|--|-------|---|------|
| Number                        | 1   |       |  |       |   |      |
| Intersection                  | England Blvd & George Elmer Dr  |       |  |       |   |      |
| Control Type                  | Two-way stop  |       |  |       |   |      |
| Analysis Method               | HCM 7th Edition   |       |  |       |   |      |
| Name                          | George Elmer Drive  |       | England Boulevard  |       | England Boulevard   |      |
| Approach                      | Northbound  |       | Eastbound  |       | Westbound   |      |
| Lane Configuration            |  |       |  |       |  |      |
| Turning Movement              | Left  | Right | Thru   | Right | Left  | Thru |
| Base Volume Input [veh/h]     | 32  | 133   | 160  | 19    | 453   | 270  |
| Total Analysis Volume [veh/h] | 35  | 145   | 174  | 21    | 492   | 293  |

## Intersection Settings

|                                    |      |      |      |
|------------------------------------|------|------|------|
| Priority Scheme                    | Stop | Free | Free |
| Flared Lane                        | No   |      |      |
| Storage Area [veh]                 | 0    | 0    | 0    |
| Two-Stage Gap Acceptance           | No   |      |      |
| Number of Storage Spaces in Median | 0    | 0    | 0    |

## Capacity Analysis




|                                   |      |      |        |        |      |        |
|-----------------------------------|------|------|--------|--------|------|--------|
| Calculated Rank                   | 3    | 2    | 1      | 1      | 2    | 1      |
| v_c, Conflicting Flow Rate        | 1462 | 185  | 0      | 0      | 195  | 0      |
| v_c, Stage 1                      | 185  | 185  | 0      | 0      | 195  | 0      |
| v_c, Stage 2                      | 1277 | 0    | 0      | 0      | 0    | 0      |
| c_p,x, Potential Capacity [veh/h] | 142  | 858  | 0      | 0      | 1378 | 0      |
| c_p,x, Stage 1 [veh/h]            | 847  | 1179 | 0      | 0      | 1721 | 0      |
| c_p,x, Stage 2 [veh/h]            | 262  | 1085 | 0      | 0      | 1623 | 0      |
| c_m,x, Movement Capacity [veh/h]  | 91   | 858  | 100000 | 100000 | 1378 | 100000 |
| c_m,x, Stage 1 [veh/h]            | 0    | 0    | 0      | 0      | 0    | 0      |
| c_m,x, Stage 2 [veh/h]            | 0    | 0    | 0      | 0      | 0    | 0      |
| c_T, Total Capacity [veh/h]       | 91   | 858  | 100000 | 100000 | 1378 | 100000 |

## Movement, Approach, &amp; Intersection Results

|   |       |       |      |      |       |      |
|---|-------|-------|------|------|-------|------|
| V/C, Movement V/C Ratio                   | 0.38  | 0.17  | 0.00 | 0.00 | 0.36  | 0.00 |
| d_M, Delay for Movement [s/veh]           | 57.31 | 22.04 | 0.00 | 0.00 | 9.06  | 0.00 |
| Movement LOS                              | F     | C     | A    | A    | A     | A    |
| Critical Movement                         | Yes   | No    | No   | No   | No    | No   |
| 95th-Percentile Queue Length [veh/ln]     | 3.16  | 3.16  | 0.00 | 0.00 | 1.64  | 0.00 |
| 95th-Percentile Queue Length [ft/ln]      | 78.98 | 78.98 | 0.00 | 0.00 | 41.04 | 0.00 |
| d_A, Approach Delay [s/veh]               | 28.90 |       | 0.00 |      | 5.68  |      |
| Approach LOS                              | D     |       | A    |      | A     |      |
| V/C_I, Worst Movement V/C Ratio           | 0.38  |       |      |      |       |      |
| d_I, Worst Movement Control Delay [s/veh] | 57.31 |       |      |      |       |      |
| d_I, Intersection Delay [s/veh]           | 8.32  |       |      |      |       |      |
| Intersection LOS                          | F     |       |      |      |       |      |



## Option 2: All-Way Stop Control

|                               |   |       |   |       |   |      |
|-------------------------------|---|-------|---|-------|---|------|
| Number                        | 1   |       |   |       |   |      |
| Intersection                  | England Blvd & George Elmer Dr  |       |   |       |   |      |
| Control Type                  | All-way stop  |       |   |       |   |      |
| Analysis Method               | HCM 7th Edition   |       |   |       |   |      |
| Name                          | George Elmer Drive  |       | England Boulevard   |       | England Boulevard   |      |
| Approach                      | Northbound  |       | Eastbound   |       | Westbound   |      |
| Lane Configuration            |  |       |  |       |  |      |
| Turning Movement              | Left  | Right | Thru  | Right | Left  | Thru |
| Base Volume Input [veh/h]     | 32  | 133   | 160   | 19    | 453   | 270  |
| Total Analysis Volume [veh/h] | 35  | 145   | 174   | 21    | 492   | 293  |

## Intersection Settings




## Lanes

|                                 |     |     |     |
|---------------------------------|-----|-----|-----|
| Capacity per Entry Lane [veh/h] | 630 | 677 | 785 |
|---------------------------------|-----|-----|-----|

## Movement, Approach, &amp; Intersection Results

|                                    |       |       |        |
|------------------------------------|-------|-------|--------|
| Average Lane Delay [s/veh]         | 10.98 | 10.46 | 73.94  |
| 95th-Percentile Queue Length [veh] | 1.18  | 1.19  | 20.54  |
| 95th-Percentile Queue Length [ft]  | 29.38 | 29.78 | 513.59 |
| Approach Delay [s/veh]             | 10.98 | 10.46 | 73.94  |
| Approach LOS                       | B     | B     | F      |
| Intersection Delay [s/veh]         | 53.50 |       |        |
| Intersection LOS                   | F     |       |        |

## Option 3: WB LT Lane and NB L and RT Lanes

|                               |   |       |  |       |   |      |
|-------------------------------|---|-------|--|-------|---|------|
| Number                        | 1   |       |  |       |   |      |
| Intersection                  | England Blvd & George Elmer Dr  |       |  |       |   |      |
| Control Type                  | Two-way stop  |       |  |       |   |      |
| Analysis Method               | HCM 7th Edition   |       |  |       |   |      |
| Name                          | George Elmer Drive  |       | England Boulevard  |       | England Boulevard   |      |
| Approach                      | Northbound  |       | Eastbound  |       | Westbound   |      |
| Lane Configuration            |  |       |  |       |  |      |
| Turning Movement              | Left  | Right | Thru   | Right | Left  | Thru |
| Base Volume Input [veh/h]     | 32  | 133   | 160  | 19    | 453   | 270  |
| Total Analysis Volume [veh/h] | 35  | 145   | 174  | 21    | 492   | 293  |

## Intersection Settings

|                                    |      |      |      |
|------------------------------------|------|------|------|
| Priority Scheme                    | Stop | Free | Free |
| Flared Lane                        |      |      |      |
| Storage Area [veh]                 | 0    | 0    | 0    |
| Two-Stage Gap Acceptance           | No   |      |      |
| Number of Storage Spaces in Median | 0    | 0    | 0    |




## Capacity Analysis

|                                   |      |      |        |        |      |        |
|-----------------------------------|------|------|--------|--------|------|--------|
| Calculated Rank                   | 3    | 2    | 1      | 1      | 2    | 1      |
| v_c, Conflicting Flow Rate        | 1462 | 185  | 0      | 0      | 195  | 0      |
| v_c, Stage 1                      | 185  | 185  | 0      | 0      | 195  | 0      |
| v_c, Stage 2                      | 1277 | 0    | 0      | 0      | 0    | 0      |
| c_p,x, Potential Capacity [veh/h] | 142  | 858  | 0      | 0      | 1378 | 0      |
| c_p,x, Stage 1 [veh/h]            | 847  | 1179 | 0      | 0      | 1721 | 0      |
| c_p,x, Stage 2 [veh/h]            | 262  | 1085 | 0      | 0      | 1623 | 0      |
| c_m,x, Movement Capacity [veh/h]  | 91   | 858  | 100000 | 100000 | 1378 | 100000 |
| c_m,x, Stage 1 [veh/h]            | 0    | 0    | 0      | 0      | 0    | 0      |
| c_m,x, Stage 2 [veh/h]            | 0    | 0    | 0      | 0      | 0    | 0      |
| c_T, Total Capacity [veh/h]       | 91   | 858  | 100000 | 100000 | 1378 | 100000 |

## Movement, Approach, &amp; Intersection Results

|   |       |       |      |      |       |      |
|---|-------|-------|------|------|-------|------|
| V/C, Movement V/C Ratio                   | 0.38  | 0.17  | 0.00 | 0.00 | 0.36  | 0.00 |
| d_M, Delay for Movement [s/veh]           | 67.17 | 10.05 | 0.00 | 0.00 | 9.06  | 0.00 |
| Movement LOS                              | F     | B     | A    | A    | A     | A    |
| Critical Movement                         | Yes   | No    | No   | No   | No    | No   |
| 95th-Percentile Queue Length [veh/ln]     | 1.53  | 0.61  | 0.00 | 0.00 | 1.64  | 0.00 |
| 95th-Percentile Queue Length [ft/ln]      | 38.33 | 15.15 | 0.00 | 0.00 | 41.04 | 0.00 |
| d_A, Approach Delay [s/veh]               | 21.16 |       | 0.00 |      | 5.68  |      |
| Approach LOS                              | C     |       | A    |      | A     |      |
| V/C_I, Worst Movement V/C Ratio           | 0.38  |       |      |      |       |      |
| d_I, Worst Movement Control Delay [s/veh] | 67.17 |       |      |      |       |      |
| d_I, Intersection Delay [s/veh]           | 7.12  |       |      |      |       |      |
| Intersection LOS                          | F     |       |      |      |       |      |

## Option 4: Roundabout

|                               |   |       |   |       |   |      |
|-------------------------------|---|-------|---|-------|---|------|
| Number                        | 1   |       |   |       |   |      |
| Intersection                  | England Blvd & George Elmer Dr  |       |   |       |   |      |
| Control Type                  | Roundabout  |       |   |       |   |      |
| Analysis Method               | HCM 7th Edition   |       |   |       |   |      |
| Name                          | George Elmer Drive  |       | England Boulevard   |       | England Boulevard   |      |
| Approach                      | Northbound  |       | Eastbound   |       | Westbound   |      |
| Lane Configuration            |  |       |  |       |  |      |
| Turning Movement              | Left  | Right | Thru  | Right | Left  | Thru |
| Base Volume Input [veh/h]     | 32  | 133   | 160   | 19    | 453   | 270  |
| Total Analysis Volume [veh/h] | 35  | 145   | 174   | 21    | 492   | 293  |

## Intersection Settings

|   |     |     |     |    |     |     |
|---|-----|-----|-----|----|-----|-----|
| Number of Conflicting Circulating Lanes | 1   |     | 1   |    | 1   |     |
| Circulating Flow Rate [veh/h]           | 177 |     | 502 |    | 36  |     |
| Exiting Flow Rate [veh/h]               | 523 |     | 335 |    | 325 |     |
| Demand Flow Rate [veh/h]                | 32  | 133 | 160 | 19 | 453 | 270 |
| Adjusted Demand Flow Rate [veh/h]       | 35  | 145 | 174 | 21 | 492 | 293 |




## Lanes

|  |         |  |         |  |         |  |
|--|---------|--|---------|--|---------|--|
| Overwrite Calculated Critical Headway      | No      |  | No      |  | No      |  |
| User-Defined Critical Headway [s]          | 4.00    |  | 4.00    |  | 4.00    |  |
| Overwrite Calculated Follow-Up Time        | No      |  | No      |  | No      |  |
| User-Defined Follow-Up Time [s]            | 3.00    |  | 3.00    |  | 3.00    |  |
| A (intercept)                              | 1380.00 |  | 1380.00 |  | 1380.00 |  |
| B (coefficient)                            | 0.00102 |  | 0.00102 |  | 0.00102 |  |
| HV Adjustment Factor                       | 0.98    |  | 0.98    |  | 0.98    |  |
| Entry Flow Rate [veh/h]                    | 184     |  | 199     |  | 801     |  |
| Capacity of Entry and Bypass Lanes [veh/h] | 1152    |  | 828     |  | 1331    |  |
| Pedestrian Impedance                       | 1.00    |  | 1.00    |  | 1.00    |  |
| Capacity per Entry Lane [veh/h]            | 1129    |  | 811     |  | 1305    |  |
| X, volume / capacity                       | 0.16    |  | 0.24    |  | 0.60    |  |

## Movement, Approach, &amp; Intersection Results

|                                    |       |       |        |
|------------------------------------|-------|-------|--------|
| Average Lane Delay [s/veh]         | 4.59  | 7.04  | 9.84   |
| Lane LOS                           | A     | A     | A      |
| 95th-Percentile Queue Length [veh] | 0.57  | 0.94  | 4.25   |
| 95th-Percentile Queue Length [ft]  | 14.16 | 23.46 | 106.35 |
| Approach Delay [s/veh]             | 4.59  | 7.04  | 9.84   |
| Approach LOS                       | A     | A     | A      |
| Intersection Delay [s/veh]         | 8.56  |       |        |
| Intersection LOS                   | A     |       |        |

## Option 1: WB Right-Turn Lane

|                               |   |       |  |      |   |       |
|-------------------------------|---|-------|--|------|---|-------|
| Number                        | 3   |       |  |      |   |       |
| Intersection                  | Mullan Rd & Chuck Wagon Dr  |       |  |      |   |       |
| Control Type                  | Two-way stop  |       |  |      |   |       |
| Analysis Method               | HCM 7th Edition   |       |  |      |   |       |
| Name                          | Chuck Wagon Drive   |       | Mullan Road  |      | Mullan Road   |       |
| Approach                      | Southbound  |       | Eastbound  |      | Westbound   |       |
| Lane Configuration            |  |       |  |      |  |       |
| Turning Movement              | Left  | Right | Left   | Thru | Thru  | Right |
| Base Volume Input [veh/h]     | 55  | 43    | 64   | 391  | 807   | 117   |
| Total Analysis Volume [veh/h] | 60  | 47    | 70   | 425  | 877   | 127   |

## Intersection Settings

|                                    |      |      |      |
|------------------------------------|------|------|------|
| Priority Scheme                    | Stop | Free | Free |
| Flared Lane                        |      |      |      |
| Storage Area [veh]                 | 0    | 0    | 0    |
| Two-Stage Gap Acceptance           | No   |      |      |
| Number of Storage Spaces in Median | 0    | 0    | 0    |

## Capacity Analysis




|                                   |      |      |      |        |        |        |
|-----------------------------------|------|------|------|--------|--------|--------|
| Calculated Rank                   | 3    | 2    | 2    | 1      | 1      | 1      |
| v_c, Conflicting Flow Rate        | 1442 | 877  | 1004 | 0      | 0      | 0      |
| v_c, Stage 1                      | 877  | 877  | 1004 | 0      | 0      | 0      |
| v_c, Stage 2                      | 565  | 0    | 0    | 0      | 0      | 0      |
| c_p,x, Potential Capacity [veh/h] | 147  | 343  | 698  | 0      | 0      | 0      |
| c_p,x, Stage 1 [veh/h]            | 410  | 1555 | 2189 | 0      | 0      | 0      |
| c_p,x, Stage 2 [veh/h]            | 573  | 1076 | 1636 | 0      | 0      | 0      |
| c_m,x, Movement Capacity [veh/h]  | 133  | 343  | 698  | 100000 | 100000 | 100000 |
| c_m,x, Stage 1 [veh/h]            | 0    | 0    | 0    | 0      | 0      | 0      |
| c_m,x, Stage 2 [veh/h]            | 0    | 0    | 0    | 0      | 0      | 0      |
| c_T, Total Capacity [veh/h]       | 133  | 343  | 698  | 100000 | 100000 | 100000 |

## Movement, Approach, &amp; Intersection Results

|   |       |       |       |      |      |      |
|---|-------|-------|-------|------|------|------|
| V/C, Movement V/C Ratio                   | 0.45  | 0.14  | 0.10  | 0.00 | 0.01 | 0.00 |
| d_M, Delay for Movement [s/veh]           | 52.87 | 17.14 | 10.73 | 0.00 | 0.00 | 0.00 |
| Movement LOS                              | F     | C     | B     | A    | A    | A    |
| Critical Movement                         | Yes   | No    | No    | No   | No   | No   |
| 95th-Percentile Queue Length [veh/ln]     | 2.03  | 0.47  | 0.33  | 0.00 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [ft/ln]      | 50.69 | 11.75 | 8.33  | 0.00 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh]               | 37.18 |       | 1.52  |      | 0.00 |      |
| Approach LOS                              | E     |       | A     |      | A    |      |
| V/C_I, Worst Movement V/C Ratio           | 0.45  |       |       |      |      |      |
| d_I, Worst Movement Control Delay [s/veh] | 52.87 |       |       |      |      |      |
| d_I, Intersection Delay [s/veh]           | 2.94  |       |       |      |      |      |
| Intersection LOS                          | F     |       |       |      |      |      |

Version 2023 (SP 0-10)

## Option 2: Signalized

|                               |   |       |  |      |   |       |
|-------------------------------|---|-------|--|------|---|-------|
| Number                        | 3   |       |  |      |   |       |
| Intersection                  | Mullan Rd & Chuck Wagon Dr  |       |  |      |   |       |
| Control Type                  | Signalized  |       |  |      |   |       |
| Analysis Method               | HCM 7th Edition   |       |  |      |   |       |
| Name                          | Chuck Wagon Drive   |       | Mullan Road  |      | Mullan Road   |       |
| Approach                      | Southbound  |       | Eastbound  |      | Westbound   |       |
| Lane Configuration            |  |       |  |      |  |       |
| Turning Movement              | Left  | Right | Left   | Thru | Thru  | Right |
| Base Volume Input [veh/h]     | 55  | 43    | 64   | 391  | 807   | 117   |
| Total Analysis Volume [veh/h] | 60  | 47    | 70   | 425  | 877   | 127   |

## Intersection Settings

|                            |                |            |            |            |            |            |
|----------------------------|----------------|------------|------------|------------|------------|------------|
| Cycle Length [s]           | 90             |            |            |            |            |            |
| Active Pattern             | Free Running   |            |            |            |            |            |
| Coordination Type          | Free Running   |            |            |            |            |            |
| Actuation Type             | Fully actuated |            |            |            |            |            |
| Lost time [s]              | 0.00           |            |            |            |            |            |
| Control Type               | Permissive     | Permissive | Permissive | Permissive | Permissive | Permissive |
| Signal Group               | 7              | 0          | 0          | 2          | 6          | 0          |
| Auxiliary Signal Groups    |                |            |            |            |            |            |
| Lead / Lag                 | Lead           | -          | -          | -          | -          | -          |
| Minimum Green [s]          | 5              | 0          | 0          | 10         | 10         | 0          |
| Maximum Green [s]          | 20             | 0          | 0          | 60         | 60         | 0          |
| Amber [s]                  | 3.0            | 0.0        | 0.0        | 3.0        | 3.0        | 0.0        |
| All red [s]                | 1.0            | 0.0        | 0.0        | 1.0        | 1.0        | 0.0        |
| Split [s]                  | 9              | 0          | 0          | 14         | 14         | 0          |
| Walk [s]                   | 7              | 0          | 0          | 7          | 7          | 0          |
| Pedestrian Clearance [s]   | 12             | 0          | 0          | 12         | 12         | 0          |
| Delayed Vehicle Green [s]  | 0.0            | 0.0        | 0.0        | 0.0        | 0.0        | 0.0        |
| l1, Start-Up Lost Time [s] | 2.0            | 0.0        | 0.0        | 2.0        | 2.0        | 0.0        |
| Minimum Recall             | No             |            |            | No         | No         |            |
| Maximum Recall             | No             |            |            | No         | No         |            |
| Pedestrian Recall          | No             |            |            | No         | No         |            |
| Pedestrian Signal Group    | 0              |            |            |            |            |            |
| Pedestrian Walk [s]        | 0              |            |            |            |            |            |
| Pedestrian Clearance [s]   | 0              |            |            |            |            |            |

## Lane Group Calculations

|   |       |       |       |      |      |
|---|-------|-------|-------|------|------|
| g / C, Green / Cycle                        | 0.09  | 0.09  | 0.71  | 0.71 | 0.71 |
| (v / s)_i Volume / Saturation Flow Rate     | 0.04  | 0.03  | 0.14  | 0.25 | 0.60 |
| so, Base Saturation Flow per Lane [pc/h/ln] | 1900  | 1900  | 1900  | 1900 | 1900 |
| Arrival type                                | 3     |       | 3     |      | 3    |
| s, saturation flow rate [veh/h]             | 1629  | 1396  | 513   | 1710 | 1669 |
| c, Capacity [veh/h]                         | 142   | 122   | 292   | 1211 | 1182 |
| X, volume / capacity                        | 0.42  | 0.39  | 0.24  | 0.35 | 0.85 |
| d, Delay for Lane Group [s/veh]             | 18.90 | 18.85 | 14.55 | 2.39 | 5.99 |




Version 2023 (SP 0-10)

|                                       |       |       |       |      |       |
|---------------------------------------|-------|-------|-------|------|-------|
| Lane Group LOS                        | B     | B     | B     | A    | A     |
| Critical Lane Group                   | Yes   | No    | No    | No   | Yes   |
| 50th-Percentile Queue Length [veh/ln] | 0.52  | 0.41  | 0.47  | 0.06 | 0.59  |
| 50th-Percentile Queue Length [ft/ln]  | 12.96 | 10.27 | 11.82 | 1.46 | 14.85 |
| 95th-Percentile Queue Length [veh/ln] | 0.93  | 0.74  | 0.85  | 0.11 | 1.07  |
| 95th-Percentile Queue Length [ft/ln]  | 23.32 | 18.49 | 21.28 | 2.63 | 26.73 |

**Movement, Approach, & Intersection Results**

|                                 |       |       |       |      |      |      |
|---------------------------------|-------|-------|-------|------|------|------|
| d_M, Delay for Movement [s/veh] | 18.90 | 18.85 | 14.55 | 2.39 | 5.99 | 5.99 |
| Movement LOS                    | B     | B     | B     | A    | A    | A    |
| Critical Movement               | Yes   | No    | No    | No   | No   | No   |
| d_A, Approach Delay [s/veh]     | 18.88 |       | 4.11  |      | 5.99 |      |
| Approach LOS                    | B     |       | A     |      | A    |      |
| d_I, Intersection Delay [s/veh] | 6.27  |       |       |      |      |      |
| Intersection LOS                | A     |       |       |      |      |      |
| Intersection V/C                | 0.639 |       |       |      |      |      |

## Option 3: Roundabout

|                               |   |       |  |      |   |       |
|-------------------------------|---|-------|--|------|---|-------|
| Number                        | 3   |       |  |      |   |       |
| Intersection                  | Mullan Rd & Chuck Wagon Dr  |       |  |      |   |       |
| Control Type                  | Roundabout  |       |  |      |   |       |
| Analysis Method               | HCM 7th Edition   |       |  |      |   |       |
| Name                          | Chuck Wagon Drive   |       | Mullan Road  |      | Mullan Road   |       |
| Approach                      | Southbound  |       | Eastbound  |      | Westbound   |       |
| Lane Configuration            |  |       |  |      |  |       |
| Turning Movement              | Left  | Right | Left   | Thru | Thru  | Right |
| Base Volume Input [veh/h]     | 100   | 61    | 23   | 904  | 201   | 41    |
| Total Analysis Volume [veh/h] | 109   | 66    | 25   | 983  | 218   | 45    |

## Intersection Settings

|   |     |    |     |     |      |    |
|---|-----|----|-----|-----|------|----|
| Number of Conflicting Circulating Lanes | 1   |    | 1   |     | 1    |    |
| Circulating Flow Rate [veh/h]           | 230 |    | 109 |     | 25   |    |
| Exiting Flow Rate [veh/h]               | 70  |    | 296 |     | 1109 |    |
| Demand Flow Rate [veh/h]                | 100 | 61 | 23  | 904 | 201  | 41 |
| Adjusted Demand Flow Rate [veh/h]       | 109 | 66 | 25  | 983 | 218  | 45 |




## Lanes

|  |         |         |         |         |         |
|--|---------|---------|---------|---------|---------|
| Overwrite Calculated Critical Headway      | No      | No      | No      | No      | No      |
| User-Defined Critical Headway [s]          | 4.00    | 4.00    | 4.00    | 4.00    | 4.00    |
| Overwrite Calculated Follow-Up Time        | No      | No      | No      | No      | No      |
| User-Defined Follow-Up Time [s]            | 3.00    | 3.00    | 3.00    | 3.00    | 3.00    |
| A (intercept)                              | 1420.00 | 1420.00 | 1420.00 | 1420.00 | 1380.00 |
| B (coefficient)                            | 0.00091 | 0.00091 | 0.00091 | 0.00091 | 0.00102 |
| HV Adjustment Factor                       | 1.00    | 1.00    | 1.00    | 0.98    | 0.96    |
| Entry Flow Rate [veh/h]                    | 109     | 66      | 25      | 1000    | 276     |
| Capacity of Entry and Bypass Lanes [veh/h] | 1152    | 1152    | 1286    | 1286    | 1346    |
| Pedestrian Impedance                       | 1.00    | 1.00    | 1.00    | 1.00    | 1.00    |
| Capacity per Entry Lane [veh/h]            | 1152    | 1152    | 1286    | 1265    | 1286    |
| X, volume / capacity                       | 0.09    | 0.06    | 0.02    | 0.78    | 0.20    |

## Movement, Approach, &amp; Intersection Results

|                                    |       |      |       |        |       |
|------------------------------------|-------|------|-------|--------|-------|
| Average Lane Delay [s/veh]         | 3.93  | 3.60 | 2.95  | 15.85  | 4.54  |
| Lane LOS                           | A     | A    | A     | C      | A     |
| 95th-Percentile Queue Length [veh] | 0.31  | 0.18 | 0.06  | 8.45   | 0.77  |
| 95th-Percentile Queue Length [ft]  | 7.82  | 4.55 | 1.49  | 211.24 | 19.19 |
| Approach Delay [s/veh]             | 3.80  |      | 15.53 |        | 4.54  |
| Approach LOS                       | A     |      | C     |        | A     |
| Intersection Delay [s/veh]         | 12.11 |      |       |        |       |
| Intersection LOS                   | B     |      |       |        |       |

## Option 1: WB Left-Turn Lane

|                               |   |       |  |       |   |      |
|-------------------------------|---|-------|--|-------|---|------|
| Number                        | 1   |       |  |       |   |      |
| Intersection                  | England Blvd & George Elmer Dr  |       |  |       |   |      |
| Control Type                  | Two-way stop  |       |  |       |   |      |
| Analysis Method               | HCM 7th Edition   |       |  |       |   |      |
| Name                          | George Elmer Drive  |       | England Boulevard  |       | England Boulevard   |      |
| Approach                      | Northbound  |       | Eastbound  |       | Westbound   |      |
| Lane Configuration            |  |       |  |       |  |      |
| Turning Movement              | Left  | Right | Thru   | Right | Left  | Thru |
| Base Volume Input [veh/h]     | 9   | 351   | 249  | 30    | 101   | 81   |
| Total Analysis Volume [veh/h] | 10  | 382   | 271  | 33    | 110   | 88   |

## Intersection Settings

|                                    |      |      |      |
|------------------------------------|------|------|------|
| Priority Scheme                    | Stop | Free | Free |
| Flared Lane                        | No   |      |      |
| Storage Area [veh]                 | 0    | 0    | 0    |
| Two-Stage Gap Acceptance           | No   |      |      |
| Number of Storage Spaces in Median | 0    | 0    | 0    |

## Capacity Analysis




|                                   |     |      |        |        |      |        |
|-----------------------------------|-----|------|--------|--------|------|--------|
| Calculated Rank                   | 3   | 2    | 1      | 1      | 2    | 1      |
| v_c, Conflicting Flow Rate        | 596 | 288  | 0      | 0      | 304  | 0      |
| v_c, Stage 1                      | 288 | 288  | 0      | 0      | 304  | 0      |
| v_c, Stage 2                      | 308 | 0    | 0      | 0      | 0    | 0      |
| c_p,x, Potential Capacity [veh/h] | 467 | 752  | 0      | 0      | 1257 | 0      |
| c_p,x, Stage 1 [veh/h]            | 761 | 1233 | 0      | 0      | 1777 | 0      |
| c_p,x, Stage 2 [veh/h]            | 745 | 1085 | 0      | 0      | 1623 | 0      |
| c_m,x, Movement Capacity [veh/h]  | 426 | 752  | 100000 | 100000 | 1257 | 100000 |
| c_m,x, Stage 1 [veh/h]            | 0   | 0    | 0      | 0      | 0    | 0      |
| c_m,x, Stage 2 [veh/h]            | 0   | 0    | 0      | 0      | 0    | 0      |
| c_T, Total Capacity [veh/h]       | 426 | 752  | 100000 | 100000 | 1257 | 100000 |

## Movement, Approach, &amp; Intersection Results

|   |       |       |      |      |      |      |
|---|-------|-------|------|------|------|------|
| V/C, Movement V/C Ratio                   | 0.02  | 0.51  | 0.00 | 0.00 | 0.09 | 0.00 |
| d_M, Delay for Movement [s/veh]           | 18.86 | 15.20 | 0.00 | 0.00 | 8.14 | 0.00 |
| Movement LOS                              | C     | C     | A    | A    | A    | A    |
| Critical Movement                         | Yes   | No    | No   | No   | No   | No   |
| 95th-Percentile Queue Length [veh/ln]     | 3.17  | 3.17  | 0.00 | 0.00 | 0.29 | 0.00 |
| 95th-Percentile Queue Length [ft/ln]      | 79.34 | 79.34 | 0.00 | 0.00 | 7.18 | 0.00 |
| d_A, Approach Delay [s/veh]               | 15.29 |       | 0.00 |      | 4.52 |      |
| Approach LOS                              | C     |       | A    |      | A    |      |
| V/C_I, Worst Movement V/C Ratio           | 0.02  |       |      |      |      |      |
| d_I, Worst Movement Control Delay [s/veh] | 18.86 |       |      |      |      |      |
| d_I, Intersection Delay [s/veh]           | 7.71  |       |      |      |      |      |
| Intersection LOS                          | C     |       |      |      |      |      |



## Option 2: All-Way Stop Control

|                               |   |       |   |       |   |      |
|-------------------------------|---|-------|---|-------|---|------|
| Number                        | 1   |       |   |       |   |      |
| Intersection                  | England Blvd & George Elmer Dr  |       |   |       |   |      |
| Control Type                  | All-way stop  |       |   |       |   |      |
| Analysis Method               | HCM 7th Edition   |       |   |       |   |      |
| Name                          | George Elmer Drive  |       | England Boulevard   |       | England Boulevard   |      |
| Approach                      | Northbound  |       | Eastbound   |       | Westbound   |      |
| Lane Configuration            |  |       |  |       |  |      |
| Turning Movement              | Left  | Right | Thru  | Right | Left  | Thru |
| Base Volume Input [veh/h]     | 9   | 351   | 249   | 30    | 101   | 81   |
| Total Analysis Volume [veh/h] | 10  | 382   | 271   | 33    | 110   | 88   |

## Intersection Settings




## Lanes

|                                 |     |     |     |
|---------------------------------|-----|-----|-----|
| Capacity per Entry Lane [veh/h] | 769 | 695 | 654 |
|---------------------------------|-----|-----|-----|

## Movement, Approach, &amp; Intersection Results

|                                    |       |       |       |
|------------------------------------|-------|-------|-------|
| Average Lane Delay [s/veh]         | 12.45 | 12.15 | 10.87 |
| 95th-Percentile Queue Length [veh] | 2.94  | 2.23  | 1.27  |
| 95th-Percentile Queue Length [ft]  | 73.44 | 55.80 | 31.83 |
| Approach Delay [s/veh]             | 12.45 | 12.15 | 10.87 |
| Approach LOS                       | B     | B     | B     |
| Intersection Delay [s/veh]         | 12.00 |       |       |
| Intersection LOS                   | B     |       |       |

## Option 3: WB LT Lane and NB L and RT Lanes

|                               |   |       |  |       |   |      |
|-------------------------------|---|-------|--|-------|---|------|
| Number                        | 1   |       |  |       |   |      |
| Intersection                  | England Blvd & George Elmer Dr  |       |  |       |   |      |
| Control Type                  | Two-way stop  |       |  |       |   |      |
| Analysis Method               | HCM 7th Edition   |       |  |       |   |      |
| Name                          | George Elmer Drive  |       | England Boulevard  |       | England Boulevard   |      |
| Approach                      | Northbound  |       | Eastbound  |       | Westbound   |      |
| Lane Configuration            |  |       |  |       |  |      |
| Turning Movement              | Left  | Right | Thru   | Right | Left  | Thru |
| Base Volume Input [veh/h]     | 9   | 351   | 249  | 30    | 101   | 81   |
| Total Analysis Volume [veh/h] | 10  | 382   | 271  | 33    | 110   | 88   |

## Intersection Settings

|                                    |      |      |      |
|------------------------------------|------|------|------|
| Priority Scheme                    | Stop | Free | Free |
| Flared Lane                        |      |      |      |
| Storage Area [veh]                 | 0    | 0    | 0    |
| Two-Stage Gap Acceptance           | No   |      |      |
| Number of Storage Spaces in Median | 0    | 0    | 0    |




## Capacity Analysis

|                                   |     |      |        |        |      |        |
|-----------------------------------|-----|------|--------|--------|------|--------|
| Calculated Rank                   | 3   | 2    | 1      | 1      | 2    | 1      |
| v_c, Conflicting Flow Rate        | 596 | 288  | 0      | 0      | 304  | 0      |
| v_c, Stage 1                      | 288 | 288  | 0      | 0      | 304  | 0      |
| v_c, Stage 2                      | 308 | 0    | 0      | 0      | 0    | 0      |
| c_p,x, Potential Capacity [veh/h] | 467 | 752  | 0      | 0      | 1257 | 0      |
| c_p,x, Stage 1 [veh/h]            | 761 | 1233 | 0      | 0      | 1777 | 0      |
| c_p,x, Stage 2 [veh/h]            | 745 | 1085 | 0      | 0      | 1623 | 0      |
| c_m,x, Movement Capacity [veh/h]  | 426 | 752  | 100000 | 100000 | 1257 | 100000 |
| c_m,x, Stage 1 [veh/h]            | 0   | 0    | 0      | 0      | 0    | 0      |
| c_m,x, Stage 2 [veh/h]            | 0   | 0    | 0      | 0      | 0    | 0      |
| c_T, Total Capacity [veh/h]       | 426 | 752  | 100000 | 100000 | 1257 | 100000 |

## Movement, Approach, &amp; Intersection Results

|   |       |       |      |      |      |      |
|---|-------|-------|------|------|------|------|
| V/C, Movement V/C Ratio                   | 0.02  | 0.51  | 0.00 | 0.00 | 0.09 | 0.00 |
| d_M, Delay for Movement [s/veh]           | 13.66 | 14.64 | 0.00 | 0.00 | 8.14 | 0.00 |
| Movement LOS                              | B     | B     | A    | A    | A    | A    |
| Critical Movement                         | No    | Yes   | No   | No   | No   | No   |
| 95th-Percentile Queue Length [veh/ln]     | 0.07  | 2.92  | 0.00 | 0.00 | 0.29 | 0.00 |
| 95th-Percentile Queue Length [ft/ln]      | 1.80  | 72.92 | 0.00 | 0.00 | 7.18 | 0.00 |
| d_A, Approach Delay [s/veh]               | 14.61 |       | 0.00 |      | 4.52 |      |
| Approach LOS                              | B     |       | A    |      | A    |      |
| V/C_I, Worst Movement V/C Ratio           | 0.51  |       |      |      |      |      |
| d_I, Worst Movement Control Delay [s/veh] | 14.64 |       |      |      |      |      |
| d_I, Intersection Delay [s/veh]           | 7.41  |       |      |      |      |      |
| Intersection LOS                          | B     |       |      |      |      |      |

## Option 4: Roundabout

|                               |   |       |   |       |   |      |
|-------------------------------|---|-------|---|-------|---|------|
| Number                        | 1   |       |   |       |   |      |
| Intersection                  | England Blvd & George Elmer Dr  |       |   |       |   |      |
| Control Type                  | Roundabout  |       |   |       |   |      |
| Analysis Method               | HCM 7th Edition   |       |   |       |   |      |
| Name                          | George Elmer Drive  |       | England Boulevard   |       | England Boulevard   |      |
| Approach                      | Northbound  |       | Eastbound   |       | Westbound   |      |
| Lane Configuration            |  |       |  |       |  |      |
| Turning Movement              | Left  | Right | Thru  | Right | Left  | Thru |
| Base Volume Input [veh/h]     | 9   | 351   | 249   | 30    | 101   | 81   |
| Total Analysis Volume [veh/h] | 10  | 382   | 271   | 33    | 110   | 88   |

## Intersection Settings

|   |     |     |     |    |     |    |
|---|-----|-----|-----|----|-----|----|
| Number of Conflicting Circulating Lanes | 1   |     | 1   |    | 1   |    |
| Circulating Flow Rate [veh/h]           | 276 |     | 112 |    | 10  |    |
| Exiting Flow Rate [veh/h]               | 146 |     | 100 |    | 666 |    |
| Demand Flow Rate [veh/h]                | 9   | 351 | 249 | 30 | 101 | 81 |
| Adjusted Demand Flow Rate [veh/h]       | 10  | 382 | 271 | 33 | 110 | 88 |




## Lanes

|  |         |  |         |  |         |  |
|--|---------|--|---------|--|---------|--|
| Overwrite Calculated Critical Headway      | No      |  | No      |  | No      |  |
| User-Defined Critical Headway [s]          | 4.00    |  | 4.00    |  | 4.00    |  |
| Overwrite Calculated Follow-Up Time        | No      |  | No      |  | No      |  |
| User-Defined Follow-Up Time [s]            | 3.00    |  | 3.00    |  | 3.00    |  |
| A (intercept)                              | 1380.00 |  | 1380.00 |  | 1380.00 |  |
| B (coefficient)                            | 0.00102 |  | 0.00102 |  | 0.00102 |  |
| HV Adjustment Factor                       | 0.98    |  | 0.98    |  | 0.98    |  |
| Entry Flow Rate [veh/h]                    | 400     |  | 311     |  | 202     |  |
| Capacity of Entry and Bypass Lanes [veh/h] | 1041    |  | 1231    |  | 1366    |  |
| Pedestrian Impedance                       | 1.00    |  | 1.00    |  | 1.00    |  |
| Capacity per Entry Lane [veh/h]            | 1021    |  | 1207    |  | 1339    |  |
| X, volume / capacity                       | 0.38    |  | 0.25    |  | 0.15    |  |

## Movement, Approach, &amp; Intersection Results

|                                    |       |       |       |
|------------------------------------|-------|-------|-------|
| Average Lane Delay [s/veh]         | 7.63  | 5.25  | 3.89  |
| Lane LOS                           | A     | A     | A     |
| 95th-Percentile Queue Length [veh] | 1.83  | 1.00  | 0.52  |
| 95th-Percentile Queue Length [ft]  | 45.71 | 25.04 | 12.97 |
| Approach Delay [s/veh]             | 7.63  | 5.25  | 3.89  |
| Approach LOS                       | A     | A     | A     |
| Intersection Delay [s/veh]         | 5.99  |       |       |
| Intersection LOS                   | A     |       |       |

## Option 1: WB RT Lane

|                               |   |       |  |      |   |       |
|-------------------------------|---|-------|--|------|---|-------|
| Number                        | 3   |       |  |      |   |       |
| Intersection                  | Mullan Rd & Chuck Wagon Dr  |       |  |      |   |       |
| Control Type                  | Two-way stop  |       |  |      |   |       |
| Analysis Method               | HCM 7th Edition   |       |  |      |   |       |
| Name                          | Chuck Wagon Drive   |       | Mullan Road  |      | Mullan Road   |       |
| Approach                      | Southbound  |       | Eastbound  |      | Westbound   |       |
| Lane Configuration            |  |       |  |      |  |       |
| Turning Movement              | Left  | Right | Left   | Thru | Thru  | Right |
| Base Volume Input [veh/h]     | 100   | 61    | 23   | 904  | 201   | 41    |
| Total Analysis Volume [veh/h] | 109   | 66    | 25   | 983  | 218   | 45    |

## Intersection Settings

|                                    |      |      |      |
|------------------------------------|------|------|------|
| Priority Scheme                    | Stop | Free | Free |
| Flared Lane                        |      |      |      |
| Storage Area [veh]                 | 0    | 0    | 0    |
| Two-Stage Gap Acceptance           | No   |      |      |
| Number of Storage Spaces in Median | 0    | 0    | 0    |




## Capacity Analysis

|                                   |      |      |      |        |        |        |
|-----------------------------------|------|------|------|--------|--------|--------|
| Calculated Rank                   | 3    | 2    | 2    | 1      | 1      | 1      |
| v_c, Conflicting Flow Rate        | 1251 | 218  | 263  | 0      | 0      | 0      |
| v_c, Stage 1                      | 218  | 218  | 263  | 0      | 0      | 0      |
| v_c, Stage 2                      | 1033 | 0    | 0    | 0      | 0      | 0      |
| c_p,x, Potential Capacity [veh/h] | 192  | 827  | 1313 | 0      | 0      | 0      |
| c_p,x, Stage 1 [veh/h]            | 823  | 1204 | 1771 | 0      | 0      | 0      |
| c_p,x, Stage 2 [veh/h]            | 346  | 1091 | 1636 | 0      | 0      | 0      |
| c_m,x, Movement Capacity [veh/h]  | 189  | 827  | 1313 | 100000 | 100000 | 100000 |
| c_m,x, Stage 1 [veh/h]            | 0    | 0    | 0    | 0      | 0      | 0      |
| c_m,x, Stage 2 [veh/h]            | 0    | 0    | 0    | 0      | 0      | 0      |
| c_T, Total Capacity [veh/h]       | 189  | 827  | 1313 | 100000 | 100000 | 100000 |

## Movement, Approach, &amp; Intersection Results

|   |       |      |      |      |      |      |
|---|-------|------|------|------|------|------|
| V/C, Movement V/C Ratio                   | 0.58  | 0.08 | 0.02 | 0.01 | 0.00 | 0.00 |
| d_M, Delay for Movement [s/veh]           | 47.36 | 9.73 | 7.80 | 0.00 | 0.00 | 0.00 |
| Movement LOS                              | E     | A    | A    | A    | A    | A    |
| Critical Movement                         | Yes   | No   | No   | No   | No   | No   |
| 95th-Percentile Queue Length [veh/ln]     | 3.13  | 0.26 | 0.06 | 0.00 | 0.00 | 0.00 |
| 95th-Percentile Queue Length [ft/ln]      | 78.13 | 6.49 | 1.46 | 0.00 | 0.00 | 0.00 |
| d_A, Approach Delay [s/veh]               | 33.17 |      | 0.19 |      | 0.00 |      |
| Approach LOS                              | D     |      | A    |      | A    |      |
| V/C_I, Worst Movement V/C Ratio           | 0.58  |      |      |      |      |      |
| d_I, Worst Movement Control Delay [s/veh] | 47.36 |      |      |      |      |      |
| d_I, Intersection Delay [s/veh]           | 4.15  |      |      |      |      |      |
| Intersection LOS                          | E     |      |      |      |      |      |

## Option 2: Signalized

|                               |   |       |  |      |   |       |
|-------------------------------|---|-------|--|------|---|-------|
| Number                        | 3   |       |  |      |   |       |
| Intersection                  | Mullan Rd & Chuck Wagon Dr  |       |  |      |   |       |
| Control Type                  | Signalized  |       |  |      |   |       |
| Analysis Method               | HCM 7th Edition   |       |  |      |   |       |
| Name                          | Chuck Wagon Drive   |       | Mullan Road  |      | Mullan Road   |       |
| Approach                      | Southbound  |       | Eastbound  |      | Westbound   |       |
| Lane Configuration            |  |       |  |      |  |       |
| Turning Movement              | Left  | Right | Left   | Thru | Thru  | Right |
| Base Volume Input [veh/h]     | 100   | 61    | 23   | 904  | 201   | 41    |
| Total Analysis Volume [veh/h] | 109   | 66    | 25   | 983  | 218   | 45    |

## Intersection Settings

|                            |                |            |            |            |            |            |
|----------------------------|----------------|------------|------------|------------|------------|------------|
| Cycle Length [s]           | 90             |            |            |            |            |            |
| Active Pattern             | Free Running   |            |            |            |            |            |
| Coordination Type          | Free Running   |            |            |            |            |            |
| Actuation Type             | Fully actuated |            |            |            |            |            |
| Lost time [s]              | 0.00           |            |            |            |            |            |
| Control Type               | Permissive     | Permissive | Permissive | Permissive | Permissive | Permissive |
| Signal Group               | 7              | 0          | 0          | 2          | 6          | 0          |
| Auxiliary Signal Groups    |                |            |            |            |            |            |
| Lead / Lag                 | Lead           | -          | -          | -          | -          | -          |
| Minimum Green [s]          | 5              | 0          | 0          | 10         | 10         | 0          |
| Maximum Green [s]          | 20             | 0          | 0          | 60         | 60         | 0          |
| Amber [s]                  | 3.0            | 0.0        | 0.0        | 3.0        | 3.0        | 0.0        |
| All red [s]                | 1.0            | 0.0        | 0.0        | 1.0        | 1.0        | 0.0        |
| Split [s]                  | 9              | 0          | 0          | 14         | 14         | 0          |
| Walk [s]                   | 7              | 0          | 0          | 7          | 7          | 0          |
| Pedestrian Clearance [s]   | 12             | 0          | 0          | 12         | 12         | 0          |
| Delayed Vehicle Green [s]  | 0.0            | 0.0        | 0.0        | 0.0        | 0.0        | 0.0        |
| l1, Start-Up Lost Time [s] | 2.0            | 0.0        | 0.0        | 2.0        | 2.0        | 0.0        |
| Minimum Recall             | No             |            |            | No         | No         |            |
| Maximum Recall             | No             |            |            | No         | No         |            |
| Pedestrian Recall          | No             |            |            | No         | No         |            |
| Pedestrian Signal Group    | 0              |            |            |            |            |            |
| Pedestrian Walk [s]        | 0              |            |            |            |            |            |
| Pedestrian Clearance [s]   | 0              |            |            |            |            |            |

## Lane Group Calculations

|   |       |       |      |      |      |
|---|-------|-------|------|------|------|
| g / C, Green / Cycle                        | 0.12  | 0.12  | 0.65 | 0.65 | 0.65 |
| (v / s)_i Volume / Saturation Flow Rate     | 0.07  | 0.05  | 0.02 | 0.58 | 0.17 |
| so, Base Saturation Flow per Lane [pc/h/ln] | 1900  | 1900  | 1900 | 1900 | 1900 |
| Arrival type                                | 3     |       | 3    |      | 3    |
| s, saturation flow rate [veh/h]             | 1629  | 1454  | 1021 | 1687 | 1585 |
| c, Capacity [veh/h]                         | 194   | 173   | 746  | 1093 | 1027 |
| X, volume / capacity                        | 0.56  | 0.38  | 0.03 | 0.90 | 0.26 |
| d, Delay for Lane Group [s/veh]             | 16.80 | 15.32 | 3.97 | 8.09 | 2.68 |




Version 2023 (SP 0-10)

|                                       |       |       |      |       |      |
|---------------------------------------|-------|-------|------|-------|------|
| Lane Group LOS                        | B     | B     | A    | A     | A    |
| Critical Lane Group                   | Yes   | No    | No   | Yes   | No   |
| 50th-Percentile Queue Length [veh/ln] | 0.78  | 0.45  | 0.03 | 0.91  | 0.04 |
| 50th-Percentile Queue Length [ft/ln]  | 19.45 | 11.14 | 0.84 | 22.71 | 0.93 |
| 95th-Percentile Queue Length [veh/ln] | 1.40  | 0.80  | 0.06 | 1.64  | 0.07 |
| 95th-Percentile Queue Length [ft/ln]  | 35.01 | 20.06 | 1.51 | 40.88 | 1.67 |

**Movement, Approach, & Intersection Results**

|                                 |       |       |      |      |      |      |
|---------------------------------|-------|-------|------|------|------|------|
| d_M, Delay for Movement [s/veh] | 16.80 | 15.32 | 3.97 | 8.09 | 2.68 | 2.68 |
| Movement LOS                    | B     | B     | A    | A    | A    | A    |
| Critical Movement               | Yes   | No    | No   | No   | No   | No   |
| d_A, Approach Delay [s/veh]     | 16.24 |       | 7.99 |      | 2.68 |      |
| Approach LOS                    | B     |       | A    |      | A    |      |
| d_I, Intersection Delay [s/veh] | 8.03  |       |      |      |      |      |
| Intersection LOS                | A     |       |      |      |      |      |
| Intersection V/C                | 0.650 |       |      |      |      |      |

## Option 3: Roundabout

|                               |   |       |  |      |   |       |
|-------------------------------|---|-------|--|------|---|-------|
| Number                        | 3   |       |  |      |   |       |
| Intersection                  | Mullan Rd & Chuck Wagon Dr  |       |  |      |   |       |
| Control Type                  | Roundabout  |       |  |      |   |       |
| Analysis Method               | HCM 7th Edition   |       |  |      |   |       |
| Name                          | Chuck Wagon Drive   |       | Mullan Road  |      | Mullan Road   |       |
| Approach                      | Southbound  |       | Eastbound  |      | Westbound   |       |
| Lane Configuration            |  |       |  |      |  |       |
| Turning Movement              | Left  | Right | Left   | Thru | Thru  | Right |
| Base Volume Input [veh/h]     | 55  | 43    | 64   | 391  | 807   | 117   |
| Total Analysis Volume [veh/h] | 60  | 47    | 70   | 425  | 877   | 127   |

## Intersection Settings

|   |     |    |     |     |     |     |
|---|-----|----|-----|-----|-----|-----|
| Number of Conflicting Circulating Lanes | 1   |    | 1   |     | 1   |     |
| Circulating Flow Rate [veh/h]           | 880 |    | 60  |     | 70  |     |
| Exiting Flow Rate [veh/h]               | 197 |    | 929 |     | 485 |     |
| Demand Flow Rate [veh/h]                | 55  | 43 | 64  | 391 | 807 | 117 |
| Adjusted Demand Flow Rate [veh/h]       | 60  | 47 | 70  | 425 | 877 | 127 |

## Lanes

|  |         |         |         |         |         |
|--|---------|---------|---------|---------|---------|
| Overwrite Calculated Critical Headway      | No      | No      | No      | No      | No      |
| User-Defined Critical Headway [s]          | 4.00    | 4.00    | 4.00    | 4.00    | 4.00    |
| Overwrite Calculated Follow-Up Time        | No      | No      | No      | No      | No      |
| User-Defined Follow-Up Time [s]            | 3.00    | 3.00    | 3.00    | 3.00    | 3.00    |
| A (intercept)                              | 1420.00 | 1420.00 | 1420.00 | 1420.00 | 1380.00 |
| B (coefficient)                            | 0.00091 | 0.00091 | 0.00091 | 0.00091 | 0.00102 |
| HV Adjustment Factor                       | 1.00    | 0.95    | 1.00    | 1.00    | 1.00    |
| Entry Flow Rate [veh/h]                    | 60      | 50      | 70      | 425     | 1007    |
| Capacity of Entry and Bypass Lanes [veh/h] | 638     | 638     | 1345    | 1345    | 1285    |
| Pedestrian Impedance                       | 1.00    | 1.00    | 1.00    | 1.00    | 1.00    |
| Capacity per Entry Lane [veh/h]            | 638     | 608     | 1345    | 1345    | 1282    |
| X, volume / capacity                       | 0.09    | 0.08    | 0.05    | 0.32    | 0.78    |

## Movement, Approach, &amp; Intersection Results

|                                    |       |      |      |       |        |
|------------------------------------|-------|------|------|-------|--------|
| Average Lane Delay [s/veh]         | 6.70  | 6.81 | 3.08 | 5.49  | 16.00  |
| Lane LOS                           | A     | A    | A    | A     | C      |
| 95th-Percentile Queue Length [veh] | 0.31  | 0.25 | 0.16 | 1.37  | 8.68   |
| 95th-Percentile Queue Length [ft]  | 7.76  | 6.27 | 4.11 | 34.26 | 217.01 |
| Approach Delay [s/veh]             | 6.75  |      | 5.15 |       | 16.00  |
| Approach LOS                       | A     |      | A    |       | C      |
| Intersection Delay [s/veh]         | 12.04 |      |      |       |        |
| Intersection LOS                   | B     |      |      |       |        |